ENVIRONMENTAL DETERMINANTS OF ADOLESCENT BODY WEIGHT

LOCAL ENVIRONMENTAL DETERMINANTS OF ADOLESCENT BODY WEIGHT IN LOW-SOCIOECONOMIC STATUS NEIGHBOURHOODS IN ONTARIO, CANADA

By

JENNIFER ASANIN DEAN, B.A. (HONS), M.A.

A Thesis

Submitted to the School of Graduate Studies

In Partial Fulfillment of the Requirements

For the Degree

Doctor of Philosophy

McMaster University

DOCTOR OF PHILOSOPHY (2011) McMaster University

(School of Geography & Earth Sciences) Hamilton, Ontario

TITLE: Local environmental determinants of adolescent bodyweight in low-socio-economic status neighbourhoods in Ontario, Canada

AUTHOR: Jennifer Asanin Dean
B.A. Hons (University of Toronto Mississauga, 2006)
M.A. (University of Toronto, 2007)

SUPERVISOR: Susan J. Elliott, Ph.D.

NUMBER OF PAGES: x, 154

ABSTRACT

A decade ago the World Health Organization declared obesity to be a 'global epidemic'. Rapidly climbing rates of excess body weight resulted in Health Canada declaring obesity as one of three major health concerns facing children today. Accordingly, there is a growing body of research examining how 'obesogenic environments' contribute to increasing prevalence. To date, multiple studies have found rates of childhood and adolescent obesity especially high in low-socioeconomic status (SES) neighbourhoods but knowledge about the specific local-level factors that shape body weight is lacking. Thus, this research focuses on examining local environmental determinants of body weight in adolescent populations living in low-socioeconomic status neighbourhoods in two cities in Southern Ontario.

Using a mixed-method, parallel case study design, this study examines the environments in two low-SES neighbourhoods in the cities of Hamilton and Mississauga, Ontario. This study utilizes the ANGELO Framework as an analytic tool to dissect local environments. In the first phase of the study, the political and socio-cultural environments in both cities are investigated through analysis of municipal policy documents, public health websites and key informant interviews. The findings reveal that the cities each held differing health priorities and values that reflected the way they approached obesity. This phase further highlighted the integrated nature of the political and socio-cultural environments and their role in shaping other environments.

The second phase of the study involved qualitative data collection from adolescents living in low-SES neighbourhoods (based on 11 SES neighbourhood measures). Specifically, a community mapping exercise and in-depth interviews with 31

participants were conducted in order to better understand how participants define and use neighbourhood space. The results indicate that there are differences between how urban and suburban residents defined neighbourhoods and that personal factors such as age, mobility and migration status influenced knowledge of the neighbourhood. Additionally, findings suggest that social interaction is a primary factor that influences adolescents use of neighbourhood space.

In the third and final phase of the study, adolescent perceptions of the determinants of body weight were collected using in-depth and go-along interviews. Results of the 31 interviews revealed that adolescents perceive obese bodies as the unhealthy product of individual-level behaviours. Further exploration of environmental determinants revealed that factors in the physical and economic environments were indeed important and were often influenced by the socio-cultural environment. Participants held the view that neighbourhood space was tempting and unhealthy, and required them to self-regulate their behaviour. This research makes significant theoretical, methodological and substantive contributions to the obesity, adolescent health, and neighbourhoods and health literatures. Policy implications and future research directions are also highlighted.

ACKNOWLEDGEMENTS

This thesis would not have been possible without the support of a number of individuals whom I deeply appreciate. First and foremost, I would like to sincerely thank Dr. Susan Elliott for her mentorship and guidance over the past four years. You have positively influenced me both professionally and personally and I feel fortunate to have been on 'Team Elliott'. I also appreciate the time, insight, and feedback from my supervisory committee members, Dr. Rob Wilton and Dr. Kim Raine. I am grateful for the substantial financial support from a SSHRC Doctoral Fellowship (752-2009-1170 03), ancillary funding through Canadian Heart Health Surveys Follow-up Study as well as numerous travel grants from McMaster University's Graduate Student Association, Yates Travel Fund and the Canadian Association of Geographers.

I have much appreciation for the key informants and adolescents who took part in this study and shared their time and perspectives with me. Special thanks to Naomi Pullen and Natalie Tacuri for starring in the recruitment video, to Haley Asanin for piloting the go-along interview, and to Jane Vankoeverden, Abe Pankhurst and Morgan Levison for their exceptional work as research assistants.

I was fortunate to have incredible colleagues throughout my time here at McMaster. From the Dean's office in GSB with Dora, Dan and Nancy, to BSB 339 with Bonnie, Dan, Francesca, Huyen, Kate, Kim, (Michelle), Morgan, Sara, Sarah and (unofficially) Liz, I was never without sincere support, great humor, constructive feedback or intellectual stimulation. Thank you friends. I have much appreciation for the talents of Michelle Vine who is one of the most organized and thoughtful people I know. A special thank you to my 'running-mate', Dan Harrington whose work ethic, quick wit

and healthy dose of reality kept the (friendly) competition interesting. Thank you for keeping me in the game Dan; it has been a pleasure sharing this experience with you.

Finally, I would like to thank all my parents (Sandra, Steve, Kim, Ruth & Chris) for their encouragement, interest and faith in my progress, even when I was unsure. Thank you to my brother Mike, for all your support (and presentation watching, proof reading, editing…) and sister Nat, for your help piloting the interview questions, making the recruitment video, and providing insight into adolescence. Most importantly, I could not have completed this degree without the unwavering support and love of two special people. Thank you to my incredible husband Allan, and my amazing son Jake for allowing me to have the best of both worlds. You are loved.

PREFACE

The papers that comprise this thesis were based on research designed, conducted, and analyzed primarily by Jennifer Asanin Dean. In the case of the first paper, Jennifer designed the data collection strategy, conducted key informant interviews and completed analysis, but a research assistant collected and partially analyzed policy data. In Chapter 3, a research assistant with GIS expertise created the maps and partially analyzed community mapping data, while the coding of qualitative data for both Chapters 3 and 4 were also conducted by a research assistant. In all cases, Jennifer supervised research assistants and created analytic strategies and coding books for their use. As supervisor of the thesis, Dr. Susan Elliott contributed significant feedback and editorial assistance on all three manuscripts, as did committee member Dr. Kim Raine for Chapter 4.

TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER ONE

CHAPTER THREE

CHAPTER FOUR

LIST OF TABLES

CHAPTER TWO

CHAPTER THREE

CHAPTER FOUR

CHAPTER ONE

Introduction

Research Context

Obesity in Canada and Abroad

In 2000, the World Health Organization (WHO) declared obesity to be a 'global epidemic' based on unprecedented rates in both the developed and developing world (WHO, 2000). The organization further estimated that in 2005 approximately two billion adults across the globe were overweight or obese (WHO, 2006). Accordingly, obesity has become a major public health concern in a number of developed countries, including Canada, where approximately 60 percent of the adult population is overweight or obese (Krewski et al., 2006; Tjepkema, 2005; Vanasse et al., 2006).

Overweight and obesity in the Canadian adult population has rapidly increased over time. For instance, prevalence rates of overweight in adult males was 48% in 1981, 57% in 1996 and 61% in 1998, while in adult females the respective rates were 30%, 35%, and 40% (Tremblay et al., 2002). A similar increase was reported for obesity among adult males from 9% in 1981 to 15% in 1998, and among adult women from 8% to 14% (Tremblay et al., 2002). In 2004, approximately 23% of Canada's adult population was obese while more than 36% of adults were overweight (Tjepkema, 2005).

Further, it has been noted that the prevalence of overweight and obesity is increasing even more rapidly among certain populations including children and adolescents. For instance, between 1981 and 1996 rates of childhood overweight and obesity more than tripled in boys (from 13% to 43%) and more than doubled in girls

(from 15% to 36%) (Tremblay et al., 2002). Similarly, over the past 25 years, adolescents classified as overweight increased by 70% (to 18%) while obesity rates grew more than three times the previous levels (to 9%) (Shields, 2005).

The rapidly climbing rates of excess body weight resulted in Health Canada (2008) declaring obesity as one of three major health concerns facing children today, further noting that:

> Many life-long diseases begin in childhood. Given the prevalence of childhood obesity, and given its contribution to many diseases, this is the first generation that may not live as long as their parents. Obesity is now having a huge life expectancy impact, which was not foreseen ten years ago. (Leitch, 2008, pg. 12)

Obesity is a known risk factor for a number of chronic diseases including diabetes, cardiovascular disease, musculoskeletal disorders and some forms of cancer (Dietz, 1998; Katzmarzyk & Ardern; 2004; Koletzko et al., 2002; Vanasse et al., 2006). Moreover, potential health impacts extend beyond physical diseases; obese children have lower self-esteem and are more likely to have mental health problems than their normal weight peers (Dietz, 1998; Procter, 2007; Puhl & Brownwell, 2006).

In addition to the increased prevalence of negative health outcomes, researchers argue that obesity results in greater use of, and potential strain on, Canada's health care system (Yach et al., 2006). Katzmarzyk and Janssen (2004) estimated that in 2001, obesity had an economic burden on the health care system of $4.3 billion representing 2.2% of the total health costs in the country.

Thus, there is an increasing and immediate need to better understand the determinants of excess body weight in order to develop strategies that will reduce health impacts both in the interim and in later-life.

Defining Obesity and its Determinants

Obesity is essentially caused by an energy imbalance whereby energy intake (caloric consumption) exceeds the amount of energy expenditure (physical activity) resulting in the storage of fat on the body (Health Canada 2003). Obesity is defined by measuring body fat. The most widely used method to date involves taking into account the height and weight ratio of an individual (measured in kg/m^2) (Health Canada, 2003). Internationally known as Body Mass Index (BMI), this measure is divided into six categories: underweight (a BMI score <18.5, normal weight (score between 18.5-24.9), overweight (a BMI score between 25-29.9) and three increasing categories of obese (starting at a score >30) (Health Canada, 2003; WHO, 2000). In youth, age and sex standardized categories are used to account for the rapid growth that takes place during childhood and early adolescence (Ogden et al., 2010). Additional methods for measuring body fat include waist to hip ratio and waist circumference. The latter has been noted as particularly effective because it measures abdominal fat which is most commonly associated with the negative physical health outcomes identified above (Mason & Katzmarzyk, 2009).

Although the energy equation above appears simplistic, the factors that contribute to energy imbalance are undoubtedly complex. Determinants span from cell to society and the multifactorial nature of obesity has resulted in a number of different experts taking up obesity-related research. To date, much of this research has focused on individual risk factors. These include genetic endowment (i.e., the body's natural ability to burn fat) (Dyck et al., 2001; Heitmann et al., 1995), lifestyle factors (i.e., eating habits,

sedentary activity) (Jahs, et al., 2001; Procter, 2007; Taylor et al., 2007), and socio-demographic and socio-economic status (i.e., gender, age, income) (Cairney & Wade, 1998; MacDonald et al., 1997; Willms et al., 2003). While this research has been integral to better understanding how genes and behaviour influence an individual's weight, these factors alone do not explain the etiology of obesity.

A more recent body of research has acknowledged the role of environmental factors that create health-inhibiting spaces for residents. Specifically, 'obesogenic environments' are those places that promote an unhealthy lifestyle through inadequate food availability and increased sedentary activity (Davison & Birch, 2001; Egger & Swinburn, 1997; Swinburn, Egger & Raza., 1999). Within this literature, increased rates of obesity have been associated with aspects of the physical (e.g., environmental quality) (Joshi et al., 2000), built (e.g., land use) (Booth, Pinkston & Poston, 2005; White, 2006), and social (e.g., neighbourhood safety) (Lumeng et al., 2006; Stafford et al., 2008) environments. Thus, while individual genes and behaviours are important determinants of body weight, so too are those environments in which these genes and behaviours are expressed.

Controversial Obesity Discourses

Past research on obesity has focused on individual-level factors with the belief that individual behaviour change will most effectively reduce the high prevalence of obesity and ultimately reduce the health outcomes and use of health care resources. This line of reasoning has held individuals responsible for maintaining a socially acceptable

body out of moral duty to themselves and society (Braziel & LeBesco, 2001; Campos et al., 2006; LeBesco, 2004).

Obese individuals are faced with a marked body that clearly identifies their deviance and abnormality in a society that values thin, lean and toned bodies (Gard & Wright, 2005; LeBesco, 2004). They are subsequently stigmatized based not just on their body size but also on the character flaws that are assumed to be the root cause of their spoiled identity (i.e., gluttony, lack of will power, immorality) (Crandall & Schiffhauer, 1998). Thus, their body clearly marks them as different and unacceptable in current society (Braziel & LeBesco, 2001; Campos et al., 2006; Gard & Wright, 2005; LeBesco, 2004).

The ways in which obese individuals have been stigmatized are well documented. Often discrimination and bias are experienced in everyday, and often unavoidable, settings such as work and school. For instance, overweight and obese adults experience hiring prejudice and are more likely to have lower wages and receive fewer promotions compared to their normal weight counterparts (Puhl & Brownell, 2001). In the school setting, obese children and adolescents face discrimination by both peers and teachers. In a study of overweight adolescent girls, 96 percent reported being stigmatized based on their weight through name-calling and derogatory jokes (Neumark-Sztainer et al., 1998). Another study among teachers demonstrated that almost half felt that obese individuals were undesirable partners in marriage, and almost 30 percent noted that being obese was one of the worst things that could happen to an individual (Neumark-Sztainer et al., 1999).

Obese children are also facing new discrimination by the media who joke about and criticize fatness, as well as fat individuals, in advertising and promotional materials (King & Hayes, 2003). Moreover, even parents are a source of bias and discrimination (Puhl & Latner, 2007). In one study of 2,400 obese adults, 44% reported that their mothers were a source of weight discrimination while 34% reported the same for fathers (Puhl & Brownell, 2006). No doubt body weight stigma is increasingly problematic with the current social climate that acknowledges obesity as a 'global epidemic' (WHO, 2000). Particularly, as obesity has become more medicalized and has moved to the forefront of public health agendas, a heightened focus on curtailing the current 'epidemic' is shared by researchers, policy-makers, clinicians, the media and lay people.

With this 'globesity' (WHO, 2000) discourse becoming more prevalent, a group of researchers have sought to challenge the stigma associated with obese bodies through the deconstruction of the science that suggests that fat is unhealthy (Colls & Evans, 2009; Campos, 2004; Gard & Wright, 2005; LeBesco, 2004; Longhurst, 2005). Essentially, this body of research argues that a direct causal link from obesity to heart disease, diabetes or any of the other morbidities widely accepted in the literature is non-existent. Rather, obese individuals are being targeted because they do not literally and figuratively 'fit in' to societal norms surrounding body size. Instead, researchers advocate for critical examinations of how fat and fatness are defined as inherently problematic, immoral and unhealthy, and seek to rewrite healthy weight discourse. One such attempt includes the Health at Every Size initiative, which aims for positive perspectives towards all body

sizes, and for the deconstruction of ideologies that suggest fat is unhealthy, particularly within the biomedical field (Aphramor, 2005; Robinson, 2005).

This dissertation is situated at a more central position in the debate. While obesity, in addition to many other chronic diseases, is a multi-factorial disease that makes direct causal relationships difficult to pin-down, there is overwhelming evidence that suggests that obesity is a risk factor for negative physical health outcomes, and certainly for emotional and mental health outcomes. Taking that into account, this research appreciates the value of the Health at Every Size movement as important for interrogating the current social climate that prioritizes certain body types over others. This research is based around the belief that a healthy body does come in all shapes, sizes and weights, and that an individual's opinion of their own body and its healthiness is an important indicator of health, while at the same time acknowledging that obesity does put individuals at increased risk for negative physical, emotional and mental health outcomes.

Geographies of Obesity

Geographers have much to offer in the way of knowledge and expertise when it comes to better understanding the obesity epidemic. Obesity does not uniformly affect populations across space, rather it has been shown to be spatially pattered and tends to influence those in more deprived areas (Harrington & Elliott, 2009; Janssen et al., 2006; Pearce & Witten, 2010). Accordingly, geographers are integral to teasing out the place-based factors that result in the uneven distribution of obesity, and dissecting those environments that have now been termed 'obesogenic'. These environments span from

large geographic scales at the global level (e.g., global food production) to smaller scales at the national, provincial and regional levels (e.g., funding for and access to health care services; public health initiatives), and even smaller still to neighbourhood environments (e.g., local availability of nutritious food) (Pearce & Witten, 2010).

Multiple studies have found rates of childhood obesity to be especially high in low-income and ethnically diverse neighbourhoods (Janssen et al., 2006; Oliver & Hayes, 2005; O'Loughlin et al., 1998). In particular a multilevel Canadian study found that both individual-level SES and area-level SES were inversely related to adolescent obesity rates (Janssen et al., 2006). Similarly, Oliver & Hayes (2005) found that neighbourhood SES had an independent effect on childhood obesity after controlling for both family and individual factors, such that neighbourhood SES was negatively correlated with obesity. They concluded that "understanding the determinants of the obesity epidemic among children requires an understanding of the places children live" (p. 419), and further expressed a need for future research to examine the pathways in which neighbourhood SES influences obesity among children.

Some researchers have attempted to examine these potential pathways by focusing on the role of diet and physical activity. With respect to the former, international research has found that healthy food options are disproportionately located in middle and high income areas, while the few options that do exist in deprived areas are often more costly than elsewhere (Chung & Myers, 1999; Helling & Sawicki, 2003; Reidpath, 2002; White, 2006; Zenk et al., 2005). However, these findings have been inconsistent (Cummins & Macintyre, 2002; Horowitz et al., 2004; Pearce et al., 2007). In

Canada, research on food availability and accessibility across neighbourhoods has also delivered mixed findings. A study in Hamilton found that there was no difference in price between grocery stores in low and high income neighbourhoods, but that there were fewer grocery stores available in low income neighborhoods (Latham & Moffat, 2007). However, a study in Montreal neighbourhoods concluded that there were no differences in food access across various income areas (Apparicio et al., 2004). Another study conducted to Edmonton found that inner city neighbourhoods had better access to supermarkets than did some higher income neighbourhoods, although some high-needs communities in suburban neighbourhoods (e.g., those with high seniors population) faced access difficulties due to distance and transportation (Smoyer-Tomic et al., 2006). These contrasting findings suggest that access to healthy food is dependent on place.

In terms of examining the pathways through which neighbourhoods influence physical activity and subsequently body weight, the general consensus is that low-SES neighbourhoods promote sedentary behaviour over physical activity. The built environment has been found to shape body weight through developments such as urban sprawl, land-use mix, and walkability which influence the number of proximal opportunities to engage in physical activity (Booth, Pinkston & Poston; 2005, Kerr, 2008; Kligerman et al., 2007; Papas et al., 2007; Powell, 2005). Among children and adolescent populations, access to good-quality recreational facilities such as parks and playgrounds as well as feelings of safety were also important predictors of increased physical activity levels and lower body weight (Carver et al., 2005; Cohen et al., 2006; Gilliland et al., 2006; Mota et al., 2005; Norman et al., 2006; Tudor-Locke, 2001; Veugelers et al., 2008).

In a pathway analysis by Stafford and colleagues (2008), the authors traced how presence of police officers and vacant land increased perceptions of social disorder in the neighbourhood, which decreased the sports participation rate and subsequently resulted in increased BMI.

While there is no shortage of research acknowledging the association between local environments and prevalence of obesity, there still is an overall gap in knowledge about the how factors in these environments influence body weight. Moreover, current research largely focuses on understanding the physical and economic environments while leaving other factors in the political and socio-cultural environments unexamined. Finally, the inconsistent findings described above suggest that a place-specific approach is necessary for better understanding the link between environment and body weight.

Research Objectives

This research aims to better understand how obesogenic environments influence adolescent body weight within the context of low-SES neighbourhoods. Accordingly, the specific research objectives are:

1) To investigate how obesogenic environments are constructed at the local level
2) To examine the influence of neighbourhood-level factors in the everyday lives of adolescents and how these may influence behaviour related to body weight
3) To explore adolescent perceptions of body weight and the importance placed on environmental determinants

Theoretical and Analytical Frameworks

This research is guided by the Population Health Framework that acknowledges the importance of both individual and environmental factors in shaping the health of populations (Figure 1). Within this framework, upstream factors such as the physical environment and health care interventions interact with individual-level factors such as genetic endowment and individual response (Evans & Stoddard, 1994). This framework is particularly useful as it provides a lens through which to understand the multifactorial and complex nature of obesity. Yet, its definition of environment is limited (i.e., only acknowledging social and physical environments), and thus the framework falls short in its capacity to comprehensively conceptualize the multiple factors within the environment that potentially influence of body weight.

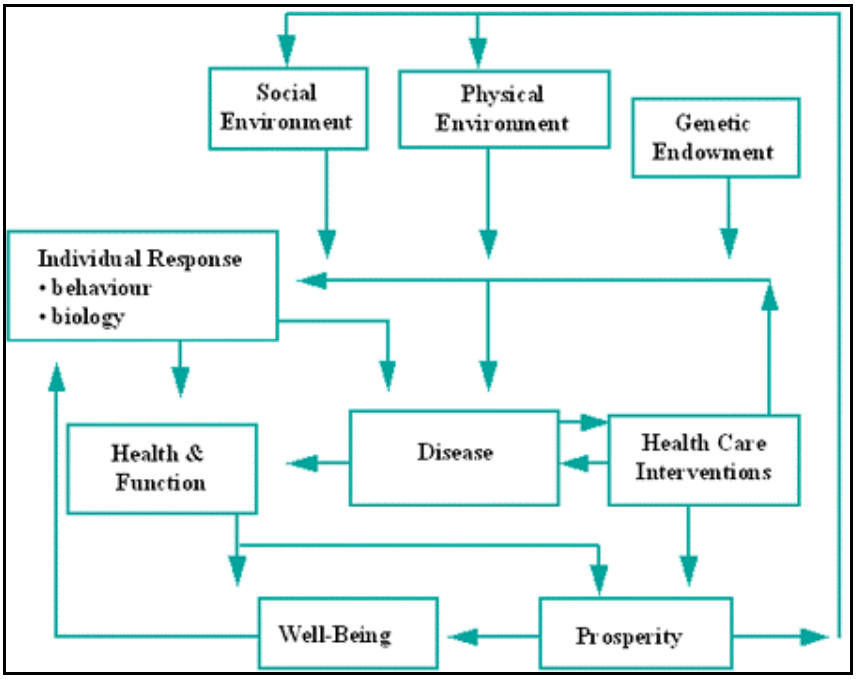


Figure 1- Population Health Framework (Evans & Stoddard, 1994)

A more appropriate tool for understanding the role of environment as a determinant of obesity is the analytical framework proposed by Swinburn and colleagues (1999) (Figure 2). The ANGELO (Analysis Grid for Environments Linked to Obesity) Framework involves multiple types (e.g., economic, physical, political, socio-cultural) and scales of environments, namely micro environments, those settings individuals occupy in daily life (e.g., home, school, neighbourhood), and macro environments, those sectors that influence the micro settings (e.g., transport system, health care system, food manufacturing/distribution sector).

SIZE / TYPE	Micro-environment (settings)		Macro-environment (sectors)	
	Diet	*Physical Activity*	*Diet*	*Physical Activity*
Physical		*What is available?*		
Economic		*What are the financial factors?*		
Political		*What are the rules?*		
Socio-cultural		*What are the attitudes, beliefs, perceptions and values?*		

Figure 2- ANGELO Framework (Swinburn, Egger & Raza, 1999)

According to this framework, it is important to examine 'environment' in a holistic sense when assessing obesogenic environments. That is, how do physical environments in a particular setting contribute to the availability of resources for individuals to use with respect to maintaining healthy physical activity levels and dietary patterns, which in turn influence body weight? Likewise, what role does the economic environment play in making such resources and/or behaviours accessible? The political environment is important for considering what informal and formal rules or policies exist that promote certain resources and/or behaviours over others; while consideration of the

socio-cultural environment is necessary to understand what resources and/or behaviours are socially-acceptable and normalized in a given setting. Thus, the ANGELO Framework is a useful and appropriate tool for teasing apart the multiple influences that various environments can have on body weight.

Further, this research is largely guided by Anthony Giddens' structuration theory. In brief, this theory suggests that human action is influenced by social, political and economic structures, and that it is humans themselves who have constructed and continue to reconstruct these structures (Giddens, 1984). Under the guidance of structuration theory, this research will acknowledge the important roles of both human agency and social structure in shaping the relationship between people and place.

Situating the Research in Contemporary Health Geography

This research is rooted in many of the traditions of contemporary health geography. In particular, this research understands health broadly as 'a resource for everyday life' (Curtis & Taket, 1996; Gatrell & Elliott, 2009), and views adolescent bodies holistically by acknowledging the importance of physical, mental, emotional and social aspects of health as well as the importance of individual perceptions of the body and its healthiness.

The empirical interests of this study are also very much in-line with those priorities identified in the new health geography. Specifically, this research investigates the role of place in general, and neighbourhoods in particular, not merely as a container to measure adolescent obesity but to more fully explore places of meaning within the

neighbourhood that influence body weight. In doing this, the explicit use of social theory, Giddens' structuration theory in particular, is taken up in order to understand the interplay between human agency and social structures as they manifest in place.

Finally, this study utilizes the broadened methodologies of health geography as it takes a qualitative mixed method approach to explore new ways of understanding environmental determinants of adolescent body weight. The use of go-along interviews and community mapping reflect the theoretical underpinnings of the research, and will be analyzed within a critical conceptualization of health. Thus, in many aspects including broadening concepts, empirical interests and social theories, and methodologies, this research is situated firmly within the contemporary health geography discipline.

Chapter Outline

This thesis is comprised of five chapters. Following this introductory section, chapters 2 to 4 include manuscripts that have been accepted or are in preparation for publication that together meet the objectives of the research outlined above.

Chapter 2 focuses on deconstructing obesogenic environments in two low-ses neighbourhoods selected on the basis of their differing socio-cultural and political environments. Using policy analysis and data from key informant interviews, this chapter examines the municipal policies and practices that shape neighbourhood environments in these two very different cities in the same region of Ontario, Canada. This chapter sets the context for understanding how obesogenic environments in low-ses neighbourhoods are shaped, and gains insight into new links between environments and body weight.

Chapter 3 addresses the second research objective by focusing on how adolescents define and utilize neighbourhood space. For this paper, data was collected through in-depth interviews with adolescents, as well as community maps created by participants. Results show that while use of neighbourhood space was similar, the definition of neighbourhood varied between the cities. This paper sheds light on how youth living in low-ses neighbourhoods engage with their local environment, and provides important guidance on how adolescents' conceptual neighbourhoods can shape health.

The fourth chapter explores the perceptions of body weight and its determinants among adolescents living in low-ses neighbourhoods. Based on qualitative interview data collected from adolescents and general ecological data collected through ground-truthing, this paper addresses the third research objective. Results provide insight into the perceived role of individual and environmental determinants in general and neighbourhood factors in particular. Additionally, a theoretical perspective to further current understandings of how local environments shape body weight is discussed.

Finally, Chapter 5 provides a conclusion to the thesis by summarizing the major findings, highlighting the theoretical, methodological and substantive contributions of the research, and discussing important policy implications and future research directions. Additional information about the researcher (i.e., biography and reflections) as well as data collection tools are included in the appendix.

References

Aphramor, L. (2005). Is A Weight-Centred Health Framework Salutogenic? Some Thoughts on Unhinging Certain Dietary Ideologies. *Social Theory & Health,* 3, 315-340.

Apparicio, P., Zorica, M & Shearmur, R. (2004). *Evaluation of accessibility to supermarkets in Montreal.* Montreal: INRS- Urbanization, Culture and Society.

Braziel, J. & LeBesco, K. (2001). *Bodies out of Bounds: Fatness and Transgression.* Los Angeles: University of California Press.

Booth, K., Pinkston, M. & Poston, W. (2007). Obesity and the built environment. *Journal of the American Dietetic Association,* 105, S110-S117.

Cairney, J. & Wade, T. (1998). Correlates of body weight in the 1994 National Population Health Survey, *International Journal of Obesity,* 22 (6); 584-591.

Campos, P., Saguy, A., Ernsberger, P., Oliver E. & Gaesser, G. (2006). The epidemiology of overweight and obesity: public health crisis or moral panic? *International Journal of Epidemiology*, 35(1); 55-60.

Carpiano, R. (2009). Come take a walk with me: The "go-along" interview as a novel method for studying the implications of place for health and well-being. *Health & Place,* 15(1); 263-272.

Carver, A., Salmon, J., Campbell, K., Baur, L., Garnett, S. & Crawford, D. (2005). How doe perceptions of the local environment relate to adolescents' walking and cycling? *American Journal of Health Promotion,* 20(2); 139-147.

Chung, C. & Myers, S. (1999). Do the poor pay more for food? An analysis of grocery store availability and food price disparities. *The Journal of Consumer Affairs,* 33(2); 276-296.

Cohen, D., Finch, B., Bower, A. & Sastry, N. (2006). Collective efficacy and obesity: The potential influence of social factors on health. *Social Science & Medicine*, 62(3): 769–778.

Colls, R. & Evans, B. (2010). Challenging Assumptions: Re-thinking the obesity 'problem'. *Geography*, 95, 99-105.

Cummins, S. & Macintyre, S. (2002). A systematic study of an urban foodscape: The price and availability of food in Greater Glasgow. *Urban Studies,* 39(11); 2115-2130.

Davison, K. & Birch, L. (2001). Childhood overweight: A contextual model and recommendations for future research. *Obesity Reviews,* 2(3): 159-171.

Dietz, W.H. (1998). Health consequences of obesity in youth: childhood predictors of adult disease. *Pediatrics*, 101, 518-525.

Dyck, R. Klomp, H. & Tan, L. (2001). From 'thrifty genotype' to 'hefty fetal phenotype': The relationship between high birth weight and diabetes in Saskatchewan Registered Indians. *Canadian Journal of Public Health,* 92(5); 340-344.

Egger, G. & Swinburn, B. (1997). An 'ecological' approach to the obesity pandemic. *British Medical Journal*, 315, 477-481.

Evans, R. & Stoddard, G. (1994). Producing Health, Consuming Health Care. *Social Science and Medicine,* 31(12); 1347-1363.

Gard, M. & Wright, J. (2005). *The Obesity Epidemic: Science Morality and Ideology.* London: Routledge.

Giddens, A. (1984). *The Constitution of Society: Outline of the Theory of Structuration.* Cambridge: Polity Press.

Gilliland, J., Holmes, M., Tucker, P., Irwin, J. 2006 'Environmental equity is child's play: Mapping public provision of recreation opportunities in urban neighbourhoods' *Vulnerable Children & Youth Studies,* 1(3); 256-268.

Health Canada. (2003). *Canadian Guidelines for body weight classification in adults*. Ottawa: Health Canada.

Heitmann, B., Lissner, L., Sorensen, T., & Bengtsson, C. (1995). Dietary fat intake and weight gain in women genetically predisposed for obesity. *American Journal of Clinical Nutrition,* 61, 1213-1217.

Horowitz, C., Colson, K., Herebrt, P. & Lancaster, K. (2004). Barriers to Buying Healthy Foods for People With Diabetes: Evidence of Environmental Disparities. *American Journal of Public Health*, 94(9); 1549-1554.

Jahs, L., Siega-Riz, A., & Popkin, B. (2001). The increasing prevalence of snacking among US children from 1977-1996. *Journal of Pediatrics,* 138, 493-498.

Janssen, I., Boyce, W., Simpson, K. & Pickett, W. (2006). Influence of individual-and area-level measures of socioeconomic status on obesity, unhealthy eating, and physical inactivity in Canadian adolescents. *American Journal of Clinical Nutrition,* 83, 139-145.

Joshi, H., Wiggins, R., Bartley, M., Mitchell, R., Gleave, S. & Lynch K. (2000). Putting health inequalities on the map: does where you live matter and why? In: Graham, H. (ed). *Understanding Health Inequalities.* Buckingham: Open University Press. 143-155

Katzmarzyk, P. T. & Ardern, C. I. (2004). Overweight and Obesity Mortality Trends in Canada, 1985-2000. C*anadian Journal of Public Health,* 95(1);16-20.

Katzmarzyk, P.T. & Janssen, I. (2004). The economic costs associated with physical inactivity and obesity in Canada: An update. *Canadian Journal of Applied Physiology*, 29(1); 90-115.

Kerr, J., Norman, G., Sallis, J.F. & Patrick, K. (2007). Exercise aids, neighbourhood safety, and physical activity in adolescents and parents. *Medicine and science in sports and exercise,* 40(7); 1244-1248.

King, N. & Hayes, D. (2003). Shame, Blame, and the "War on Childhood Obesity": Confronting the real Problems, Identifying the Positive Solutions. *Healthy Weight Journal,* 2, 28-32.

Kligerman, M., Sallis, J.F., Ryan, S., Frank, L., Nader, P. & Philips, R. (2007). Association of neigbourhood design and recreation environment variables with physical activity and BMI in adolescents. *American Journal of Health Promotion,* 21(4); 274-277.

Koletzko, B., Giradet, J.P., Klish, W., Tabacco, O. (2002). Obesity in Children and Adolescents Worldwide: Current views and future directions- Working group report on the first World Congress of Pediatric Gastroenterology, Hepatology and Nutrition. *Journal of Pediatric Gastroenterology, Hepatology and Nutrition*, 35, S205-212.

Krewski, D., Lemyre, L., Turner, M. C., Lee, J. E. C., Dallaire, C., Bouchard, L., Brand, K., & Mercier, P. (2006). Public Perception of Population Health Risks in Canada: Health Hazards and Sources of information. *Human and Ecological Risk Assessment*, 12(4); 626-644.

Latham, J. & Moffat, T. (2007). Determinants of variation in food cost and availability in two socioeconomically contrasting neighbourhoods of Hamilton, Ontario, Canada. *Health & Place,* 13: 273-287.

Lumeng, J., Appugliese, D., Cabral, H., Bradley, R & Zuckerman, B. (2006). Neighbourhood safety and overweight status in children. *Archives of pediatric and Adolescent Medicine,* 160(1); 25-31.

LeBesco K. (2004). *Revolting Bodies: The Struggle to Redefine the Fat Identity*. Boston: University of Massachusetts Press.

Leitch, K. (2008). *Reaching for the Top: A Report by the Advisor on Healthy Children and Youth*. Health Canada: Ottawa. Catalogue no. H21-296/2007E

Longhurst R. (2005). Fat bodies: developing geographical research agendas. *Progress in Human Geography*, 29(3)*;* 247-259.

MacDonald, S., Reeder, B., Chen, Y. & Despres, J-P. (1997). Obesity in Canada: a descriptive analysis. *Canadian Medical Association Journal*, 157, S3-S9.

Mason C. & Katzmarzyk, P.T. (2009) Variability in waist circumference measurements according to anatomic measurement site. *Obesity*, 17(9);1789-1795.

Mota, J., Almeida, M., Santos, P. & Ribeiro, J.C. (2005) Perceived neighborhood environments and physical activity in adolescents. *Preventive Medicine,* 41, 834-836.

Neumark-Sztainer, D., Story M. and Faibisch, L. (1998). Perceived stigmatization among overweight African-American and Caucasian adolescent girls. *Journal of Adolescent Health,* 23, 264-270.

Neumark-Sztainer, D., Story, M., Harris, T. (1999). Beliefs and attitudes about obesity among teachers and school health care providers working with adolescents. *Journal of Nutritional Education,* 31, 3-9.

Norman, G., Nutter, S., Ryan, S., Sallis, J.F., Calfas, J. & Patrick, K. (2006). Community design and access to recreational facilities as correlates of adolescent physical activity and body-mass index, *Journal of Physical Activity and Health,* 3(1); S118–S128.

O'Loughlin, J., Paradis, G., Renaud, L., Meshefedjian, G. & Gray-Donald, K. (1998). Prevalence and correlates of overweight among elementary schoolchildren in multiethnic, low income, inner-city neighbourhoods in Montreal, Canada. *Annals of Epidemiology*, 8(7); 422-432.

Ogden CL, Carroll MD, Curtin LR, Lamb MM, Flegal KM. Prevalence of high body mass index in U.S. children and adolescents, 2007-2008. JAMA 303(3):242-9. 2010.

Oliver, L. & Hayes, M. (2005). Neighbourhood socio-economic status and the prevalence of overweight Canadian children and youth. *Canadian Journal of Public Health*, 96 (6); 415-420.

Papas M., Alberg A. Ewing R., Helzlsouer K. J., Gary T. & Klassen A.C. (2007). The built environment and obesity. *Epidemiologic Reviews*, 29(1); 129-143.

Pearce J, Witten K. (eds) (2010) *Geographies of Obesity: Environmental Understandings of the Obesity Epidemic*. Aldershot; Ashgate.

Pearce, J., Witten, K., Hiscock, R. & Blakely, T. (2007). Are socially disadvantaged neighbourhoods deprived of health-related community resources? *International Journal of Epidemiology*, 36(2); 348-355.

Powell, K. (2005). Land use, the built environment, and physical activity: a public health mixture; a public health solution, *American Journal of Preventive Medicine,* 28, 216–217.

Procter, K. (2007). The aetiology of childhood obesity: a review. *Nutritional Research Review*s, 120, 29-45.

Puhl, R. & Brownell, K. (2001). Bias, discrimination, and obesity. *Obesity Research,* 9(12); 788-805.

Puhl, R. & Brownell, K. (2006). Confronting and coping with weight stigma: An investigation of overweight and obese individuals. *Obesity,* 14*,* 1802-1815.

Puhl, R. & Latner, J. (2007). Stigma, Obesity, and the health of the nation's children. *Psychological Bulletin*, 133(4); 557-580.

Reidpath, D., Burns, C., Garrard, J. Mahoney, M. & Townsend, M. (2002). An ecological study of the relationship between social and environmental determinants of obesity. *Health and Place*, 8, 141-145.

Robinson, J. (2005). Health at every size: toward a new paradigm of weight and health *Medscape General Medicine,* 7, 3-13.

Shields, M. (2005). *Measured Obesity: Overweight Canadian children and adolescents.* Nutrition: Findings from the Canadian Community Health Survey, Statistics Canada,

Smoyer-Tomic, K., Spence, J. & Amrhein, C. (2006). Food deserts in the Prairies? Supermarket accessibility and neighbourhood need in Edmonton, Canada. *The Professional Geographer,* 58(3); 307-326.

Stafford, M., Cummins, S., Ellaway, A., Sacker, A., Wiggins, R. & Macintyre, S. (2008). Pathways to obesity: Identifying local, modifiable determinants of physical activity and diet. *Social Science and Medicine, 65,* 1882-1897.

Swinburn, B., Egger, G., & Raza, F. (1999). Dissecting Obesogenic Environments: The development and application of a framework for identifying and prioritizing environmental interventions for obesity. *Preventive Medicine,* 29, 563-570.

Taylor, J., Evers, S. & McKenna, M. (2005). Determinants of healthy eating in children and youth. *Canadian Journal of Public Health*, 96(3); S20-S26.

Tjepkema, M. (2005). Adult Obesity in Canada: Measured height and weight. *Nutrition: Findings from the Canadian Community Health Survey.* Statistics Canada Catalogue no. 82-MWE2005001.

Trembley, M., Katzmarzyk, P.T. & Willms, J. (2002). Temporal trends in overweight and obesity in Canada, 1981-1996. *International Journal of Obesity,* 26, 538-543.

Tudor-Locke, C., Ainsworth, B. & Popkin, B. (2001) Active commuting to school: an overlooked source of children's physical activity? *Sports Medicine,* 31(5); 373–387.

Vanasse, A., Demers, M., Hemiari, A. & Courteau, J. (2006). Obesity in Canada: where and how many? *International Journal of Obesity,* 30, 677-683.

Veugelers, P., Sithole, F., Zhang, S. & Muhajarine, N. (2008)Neighborhood characteristics in relation to diet, physical activity and overweight of Canadian children. *International Journal of Pediatric Obesity*, 3(3), 152 – 159.

White, M. (2006). Food access and obesity. *Obesity Reviews,* 8(1); 99-107.

Willms J.D., Tremblay M.S. & Katzmarzyk, P.T. (2003). Geographic and Demographic Variation in the Prevalence of Overweight Canadian Children, *Obesity Research*, 11(5), 668 – 673.

World Health Organization. (WHO) (2000). *Obesity: Preventing and Managing the Global Epidemic,* WHO Technical Report Series: 894, Geneva, Switzerland.

World Health Organization. (WHO) (2006). *Obesity and Overweight.* Fact sheet N. 311 Geneva: WHO.

Yach, D., Stuckler, D. & Brownell, K. D. (2006). Epidemiologic and economic consequences of the global epidemics of obesity and diabetes. *Nature Medicine, 12*(1): 62-67.

Zenk, S., Schulz, A., Israel, B., James, S., Boas, S. & Wilson, M. (2005). Neighbourhood racial composition, poverty and the spatial accessibility of supermarkets in metropolitan Detroit. *American Journal of Public Health,* 95: 660-667.

CHAPTER TWO

Prioritizing Obesity in the City

Authors: Jennifer Asanin Dean, PhD Candidate[1], Susan J. Elliott, PhD[2]

[1]School of Geography & Earth Sciences, McMaster University
Hamilton, ON, Canada

[2]School of Public Health & Health Systems, University of Waterloo
Waterloo, ON, Canada

Published version: Journal of Urban Health (2011). *In press*.

Abstract

A decade ago the World Health Organization declared obesity to be a global epidemic. Accordingly, there is a growing body of research examining how 'obesogenic environments' contribute to the increasing prevalence of obesity. Using the ANGELO Framework, this research explores the role of municipal policies and practices in constructing obesogenic environments in two Southern Ontario cities in order to examine how socio-cultural and political environments shape excess body weight. Data was collected from municipal policy documents, public health websites and key informants in Hamilton and Mississauga, Ontario, Canada. Results indicate that while the cities took different approaches to dealing with obesity, they both reflected the cities' overall prioritizing of health. Additionally, the findings reveal the pervasiveness of values and attitudes held in the socio-cultural environment in further shaping (and being shaped by) political as well as economic and physical environments in the cities. The importance of explicitly acknowledging the official discourse of the city, which this study demonstrates to be a significant factor in constructing obesogenic environments, is highlighted. Theoretical contributions and policy implications are also discussed.

Introduction

That we are facing a global epidemic of obesity has been widely discussed since the World Health Organization made this claim nearly a decade ago (WHO, 2001). The health implications of excess body weight (Katzmarzyk & Ardern, 2003; Vanasse et al., 2006) as well as the increased costs for health care systems (Katzmarzyk & Janessen, 2004; Yach et al., 2006) have been major drivers for managing the epidemic.

Much past research has emphasized the importance of individual level factors (e.g., genetics, socio-demographic characteristics, lifestyle behaviours) in determining body weight (Dyck et al., 2001; Procter 2007; Taylor et al., 2007; Willms et al., 2003). This body of research implies that obese individuals are responsible for their own body and health, and subsequently those with excess body weight are stigmatized based not solely on body size but also on the character flaws that are assumed to produce such unhealthy bodies (i.e., gluttony, sloth, lack of will power, immorality) (Crandall & Schiffhauer, 1998; Evans, 2005). This line of reasoning has placed much onus on individuals to control their own weight out of moral duty to themselves and society (Campos et al., 2006; Gard & Wright, 2005; LeBesco, 2004).

However, there has been an increasing recognition by researchers as well as policy makers that environmental factors also play a role in the prevalence of obesity. Specifically, more attention has been placed on 'obesogenic environments' that promote unhealthy eating patterns, reduced levels of physical activity and increased sedentary behaviour, and consequently contribute to rise in body weight (Davison & Birch, 2001; Egger & Swinburn, 1997). In contrast to the 'blame the victim' approach above, this

stream of research focuses on population-level/structural factors that are often out of the control of individuals.

The ANGELO Framework (Swinburn, Egger & Raza, 1999), suggests there are scales (n=2) and types (n=4) of environments that contribute to the obesogenicity of a particular place. For instance, both micro-environmental settings (i.e., home, workplace, neighbourhood) and macro-environmental sectors (i.e., international food production, regional transportation services, provincial health policies) influence the physical activity and dietary patterns that contribute to obesity. In addition to small and large-scale environmental influences, this framework acknowledges types of environments (physical, economic, socio-cultural and political) that influence obesity. For example, physical environments affect access to children's playgrounds while economic environments affect the cost of fresh fruits and vegetables. Moreover, the socio-cultural environment can impact feelings of safety when using public spaces, and political environments dictate policies related to, for example, vending machine access in public spaces such as schools. Some of these environmental factors shape body weight more directly (i.e., cost of health foods, access to outdoor play spaces) than others (i.e., poverty reduction programs, community policing strategies to maintain safe parks). In summary, the ANGELO Framework is a comprehensive tool to conceptualize how factors beyond the individual may influence obesity.

To date, there has been an abundance of research demonstrating a relationship between certain local (micro) environments and excess body weight. Specifically, higher rates of overweight and obesity are associated with low socio-economic status (SES)

neighbourhoods in urban centres in many developed countries including Australia (King et al., 2006), Canada (Harrington & Elliott, 2009; Janssen et al., 2006), New Zealand (Pearce et al., 2007), the UK (Ellaway et al., 2005), and the US Mobley et al., 2006; Robert & Reither, 2004). The pathways through which these neighbourhoods shape body weight have been the focus of investigation by researchers who note that access to unhealthy foods is high (Latham & Moffat, 2007; Zenck et al., 2005), while physical activity is limited by fear of using public space (Carver et al., 2008; Stafford et al., 2008), high levels of traffic (Timperio et al., 2005), poor walkability (Booth, Pinkston & Poston, 2005; Papas et al., 2007), and lack of amenities (Tucker et al., 2009).

Yet, while there has been an abundance of studies examining the link between environmental scale and increased rates of obesity, specific types of environments have not garnered the same attention by researchers. A recent systematic review of research on urban environments and body weight found that the majority of studies focused on the role of economic and physical environments in shaping obesity, with considerably less research examining socio-cultural environments (Raine et al., 2008). The authors further note, "perhaps the most striking finding in our review was the complete lack of evidence for the role of political settings and sectors in relation to obesity/healthy weights in the urban context" (Raine et al., 2008, p. 33). Similarly, a recent scoping review of literature related to environment and obesity found only two studies relevant to the political environment and obesity (conducted in school and home settings), and noted that research on the socio-cultural environment was limited (Kirk, Penney & McHugh, 2010). Both of these studies suggest that there is a dearth of research examining the role of

political and, to some extent, socio-cultural environments despite that conceptually these environments have been identified as relevant factors shaping obesity (i.e., ANGELO Framework) and have been long identified as relevant determinants of population health (Berkman & Kawachi, 2000; Curtis & Taket, 1993; Evans, Barer & Marmar, 1994; Lupton, 1995). The absence of research on these types of environments may be in large part due to the difficulty of investigating factors in the socio-cultural and political environments using the quantitative methods that have most often been utilized in linking local environments with obesity (Badland et al., 2009). Nonetheless, understanding the mechanisms through which *multiple* factors in local environments shape body weight is increasingly important in order to understand, and subsequently slow, the rapidly rising rates of obesity.

Accordingly, this study aims to explore the role of socio-cultural and political environments that influence body weight in obesogenic micro-environments. While the research indicates that low-SES neighbourhoods are most commonly associated with high rates of obesity, the socio-cultural and political conditions at this micro-level are more often constructed at a larger scale, such as the municipality, region, state/province and/or nation. These larger scale environmental factors shape micro-environments, and subsequently influence obesity, through many potential pathways. For instance at the municipal level, such mechanisms may include municipal priorities (e.g., focus on environmental sustainability), funding decisions (e.g., closure of underused public transportation routes), service-delivery practices (e.g., dissemination of public health information), as well as planning policies (e.g., creation of zoning laws that ensure mixed

land use).

As the aim of this study is to examine previously neglected types of environments that operate at a micro-environmental scale, this research was guided by the broad research question: How do municipal priorities and policies shape obesogenic environments?

Research Design & Methods

This paper explores the role of socio-cultural and political environments in constructing urban obesogenic environments. In so doing, the following objectives are addressed:

a) What is the role of municipal health policies and strategic plan priorities in shaping the *political* environment as it relates to obesity?
b) What is the role of municipal obesity discourse in shaping *socio-cultural* environments related to obesity?

Using a parallel case-study design, three sources of data were used to address the objectives: municipal policy documents, public health unit websites, and key informant interviews. According to the ANGELO Framework, the political environment is composed of the informal/formal rules and policies related to obesity, while the socio-cultural environment refers to the attitudes, values and beliefs that directly/indirectly shape body weight (Egger, Raza & Swinburn, 1999). Thus, in this study the policy documents and public health websites are used to investigate the political environment in both cities by examining the health priorities and initiatives related to obesity. The socio-cultural environments in both cities are explored by qualitatively examining the obesity

discourse found in the documents and websites. Key informant interviews were conducted to explore the values and attitudes towards health and obesity held by community stakeholders, as well as how urban priorities are implemented. All data were triangulated (Farmer et al., 2006) in order to paint a comprehensive picture of what the socio-cultural and political environments looked like in both cities.

Research Settings

Two mid-sized, Southern Ontario cities were selected for this study based on prevalence of obesity. The City of Hamilton is situated at the most Western point of Lake Ontario, halfway between Toronto, Ontario and Buffalo, New York. Although situated along the Niagara Escarpment and home to two major post-secondary institutions, Hamilton is widely known for its long-time steel manufacturing industry. The city has battled an 'unhealthy' reputation largely based on the pollution caused by industry and is in the process of actively shifting it 'Steel City' image (Wakefield & McMullan, 2005). Hamilton was developed in 1846 with traditional Victorian design. It has since developed into a distinct urban centre, complete with inner-city neighborhoods, and more recent suburban communities. The City of Hamilton is composed of the original city of Hamilton in addition to five major suburbs surrounding the urban core. Unlike the situation in the US, municipal politics in Canada is by definition non-partisan. However, there is no question that municipal leaders have particular obvious 'leanings'. Politically, Hamilton's leadership has been unstable over the past decade, as leadership has changed hands four times. The current mayor, who received only 30% of the vote, has been viewed as being left of centre with priorities focusing on de-amalgamating the city and its

surrounding suburbs and revitalizing the inner city core. The new mayor will serve with a majority of re-elected council members with various political ideologies. In contrast, the City of Mississauga is situated 30km east of Hamilton, and is part of the Greater Toronto Area (GTA). Mississauga, incorporated as a city in 1974 is a sprawling suburb of Toronto and is home to Canada's largest airport and is thus a major gateway city for new immigrants. In contrast to the City of Hamilton, Mississauga is well known for its stable government with Mayor Hazel McCallion presiding for over 30 years and winning her twelfth term with over 75% of the vote. This mayor is acknowledged as having a slightly right of centre approach with fiscal responsibility, including the city's current debt-free state, as a major priority over the years. One of the city's prized projects is the 2005 development of The Healthy City Stewardship Centre (HCSC) which earned the city a 2007 World Leadership Award from the World City Forum (Mississauga, 2007). The HCSC is part of the WHO's healthy cities project (WHO, 2010) and brings together government, industry, education and community sectors in order to improve the health of the city's population.

While both cities are mid-sized, Mississauga is larger and more ethnically diverse than Hamilton (Table 1). The cities tend to straddle the Province of Ontario on almost all socio-demographic characteristics with Mississauga having higher average dwelling values, average household income and higher levels of education than both the province and the City of Hamilton. Both cities have higher rates of unemployment than the province as well as higher percentage of individuals living in poverty.

With respect to body weight, Hamilton is above the provincial average with almost 60% of the adult population being overweight or obese, while Mississauga is below the provincial average with a rate of 47% (Table 1). Moreover, a 2004 survey using direct measures of height and weight from a sample of the Canadian population found that the City Hamilton had the highest overweight/obesity rate in the country (Shields & Tjepkema, 2006).

Table I - Socio-demographic Comparison of Cities and Province

	Hamilton	**Mississauga**	**Ontario**
Total Population	504,560	668,550	12,160,282
Immigrant Status	26.6%	51.6%	28.3%
Non-official Languages	26.2%	48.9%	26.4%
Median Household Income	$55,312	$71,393	$60,455
Average Dwelling Value	$252,248	$377,116	$297,479
Unemployment Rate	6.5%	6.5%	6.4%
% High School Education	74.9%	81.7%	77.8%
% below Low income Cut-off	16.8%	14%	11.7%
Overweight/Obese*	59.4%	47%	48.5%

Adapted from Statistics Canada, 2006 Canadian Census.

* Adults aged 18 and over; Canadian Community Health Survey, 2005.

Policy Documents

In both cities, the urban strategic planning documents were collected (City of Hamilton, 2009; City of Mississauga, 2009) as well as the public health strategic plans (City of Hamilton, 2007; Region of Peel, 2009). These official plans were analyzed using

content analysis. The urban strategic plans were coded for content related to overall city priorities (in order to assess where health and/or obesity lie in these priorities) while public health strategic plans were coded for content related specifically to obesity (in order to understand where obesity as a priority lie). Documents were also coded alongside key informant interviews for discussion of the policies/initiatives related to obesity that are currently in effect or planned for implementation.

Public Health Websites

The websites for Hamilton Public Health Services (HPHS, 2010) and Peel Region Public Health Unit (PPHU, 2010) were analyzed both for content and discourse related to obesity. Specifically, the content search involved quantitatively identifying any web pages on the public health site, externally linked files (e.g., .pdf files), as well as referral to external links that discussed major issues related to body weight (i.e., body weight/overweight /obesity; physical activity/exercise; nutrition/healthy eating/diet; body image) (of 250 words or more). The aim of quantitatively evaluating the website content was to gain insight into what aspects of obesity were focused on by the public health units.

Both websites were also analyzed for the quality of content available using discourse analysis (Fairclough, 1989; Wodak, 2009), whereby the social implications behind the content (i.e., maintenance of power relations/social inequality) are explicitly identified. The websites varied greatly in their content so similar pages related to childhood obesity (HPHW, 2007; PPH, 2010) were used for analysis with a focus on how

obese bodies were described and problematized, what determinants of body weight were discussed, and suggested interventions.

Interviews

In each city, five key informants were selected based on their knowledge of city-wide health issues (e.g., public health professionals, city councilors, urban planners) or of health concerns facing high-risk populations (i.e., youth and low-income populations) (e.g., school officials, public health nurses, community workers). Purposeful sampling (Patton, 2002) was used to identify potential interviewees who were then sent a letter of information about the study. Potential participants then received a follow-up e-mail or phone call to confirm their interest.

Interviews were held at a time and place convenient for the participant, most often at their office but on one occasion over the phone. Interviews lasted between 30-45 minutes and were audio recorded pending consent (in one case, a city councilor preferred not to be recorded in which case more extensive written notes were taken).

The interview script was semi-structured and included sections on key informants' experience with and knowledge of the community, important health concerns facing community members, and the relevance of health issues and local policies to the work they do. Transcribed interviews were then coded for thematic analysis.

This study received ethics approval from McMaster University Research Ethics Board, with a particular emphasis on protecting the anonymity of key informants. In some cases, additional ethics reviews by external committees and/or approval from supervisors were necessary prior to conducting an interview (in three cases, access to key

informants was denied by the external committees citing time and resource constraints).

Results

Health as a Strategic Priority

As evident in the strategic planning documents, health was a central part of the future plan of both cities (Table 2). In Mississauga, key informants agreed that although health was not an explicit strategic priority, it was interwoven with all other aspects of the community well-being including social, economic, psychological and physical.

'Healthy community' was an explicit priority area in Hamilton and key informants agreed that this was a major focal area for the city. However, health was viewed as an independent priority rather than an integrated component of the city's strategic plan as expressed in Mississauga.

Obesity as a Health Priority

The analysis of public health unit strategic plans (Table 3) revealed that Mississauga did have a specific anti-obesity strategy that focused on creating supportive environments:

> We will consider the effect of our built environment (and the food environment) in the development of our anti-obesity strategy… The current obesogenic environment makes weight management, much less weight loss, extremely difficult. (Peel Public Health Strategic Plan 2007-2011, pg. 8)

While the regional public health unit serving Mississauga identifies obesity as one of four major priority areas, key informants did not share the same views of the region's health priorities (Table 3). Only one key informant identified obesity to be a priority issue for Mississauga's population.

Table 2 - Health as a Strategic Priority

City of Mississauga	City of Hamilton
Urban Strategic Plan Priority Areas	
• Move: developing a transit-oriented city "Mississauga is a city that values clean air and *healthy* lifestyles…" • Belong: ensuring youth, older adults and new immigrants thrive • Connect- completing our neighbourhoods "…residents support a rich, *healthy* and prosperous social and cultural mosaic..." • Prosper: cultivating creative and innovative businesses • Green: live green "…leave a legacy of a clean and *healthy* natural environment"	• Skilled, Innovative and Respectful Organization • Financial Sustainability • Effective Inter-governmental Relations • Growing Our Economy • Social Development • Environmental Stewardship • *Healthy* Community "*Healthy* and safe lifestyles are supported by quality built and natural environments."
Key Informants Prioritize Health	
"[Health] is vital... If we have healthy individuals, they are going to pay off economically because you are going to have a more productive workforce…. there is an inextricable link between the health and well being of our residents and our community…"	"I don't know anyone working for the City of Hamilton who doesn't think health is important… but it isn't *really* an issue unless something goes wrong with it."

Table 3 - Obesity as a Health Priority

City of Mississauga	City of Hamilton
Priority Health Areas (Public Health Unit Strategic Plan)	
• Nurturing the next generation (early child development) • Living tobacco-free • Supportive environments for healthy weight • Surveillance: data for action	• Improve local air quality • Support preparedness and response to public health emergencies • Maximize chronic disease prevention in 4 key areas: tobacco control, nutrition, physical activity, mental health • Gather, analyze & disseminate health information • Be recognized as health experts in the community
Priority Health Areas: Key Informants (based on frequency of mention)	
• Job security & Income (e.g., employment of newcomers; low-income families) • Mental health (e.g., stress) • Violence (e.g., gangs, domestic abuse) • Obesity	• Poverty (e.g., high % of low-income families) • Mental Health (e.g., addiction & psychiatric disorders) • Air Pollution (e.g., caused by industry) • Obesity

In Hamilton, obesity was not a specific priority area in the public health strategic plan, rather body weight was indirectly relevant in the focus on nutrition and physical activity. Within this area, the city also acknowledges the importance of the environment by stating that Hamilton Public Health Services will "advocate for environments that support healthy behaviours" (HPHS, 2007, pg. 2). Among key informants in Hamilton, only one individual stated that obesity was a priority issue for the population.

Prioritizing Obesity in the City

Although key informants in both cities did not initially identify obesity as a top health priority, all participants were asked to speak specifically about obesity at which point they felt it was still an important health concern for their respective populations.

In Mississauga, most key informants felt that because the regional public health unit had listed healthy weights as one of its key strategic areas, that obesity was an important issue in the city: "the region has set strategic priorities, and I know that our Medical Officer of Health is huge on obesity." (Mississauga Key Informant (KI)-1).

In Hamilton, key informants stated that high rates of obesity in the city suggested that it was an issue of concern:

> A particularly nagging issue is child obesity, because it does translate into adult obesity... I see obesity very clearly just walking around Hamilton. You see overweight parents, overweight kids. (Hamilton KI-2)

Echoing the public health strategic plans which identified obesity (in some capacity) as a priority area, both public health units did disseminate information about obesity on their websites for public consumption. The results of the content analysis of websites revealed that obesity-related documents were more prevalent on the Peel Public Health website,

the majority of which were available on the pages of the website (rather than as downloadable files or as links to external websites) (Table 4).

Table 4 - Obesity-related Content on Public Health Websites

	Peel (Mississauga)[52]	**Hamilton[51]**
Total references to all topics	202	82
-web pages	131 (65%)	15 (18%)
-downloadable files	49 (24%)	46 (56%)
-external links	22 (11%)	21 (26%)
Body Weight	4 (2%)	1 (1%)
Physical Activity	66 (33%)	26 (32%)
Nutrition	112 (55%)	37 (45%)
Body Image	14 (7%)	2 (2%)
Healthy lifestyle (general)	5 (3%)	16 (20%)

In terms of content topics, both units had the largest proportion of content dedicated to nutrition and diet, followed by physical activity. Specific content dedicated to body weight comprised the smallest proportion of articles on both websites. These focal areas suggest that the priority lies in the lifestyle behaviours rather than explicitly on body weight.

Additionally, the way in which both public health units depicted obesity as problematic differed. Hamilton viewed obese bodies as unhealthy, simultaneously identifying fat bodies as negative. In contrast, Peel explicitly focused on healthy bodies as coming in all forms (including with fat):

> Healthy bodies can come in a variety of shapes and sizes…An active, overweight person has a lower risk 0f developing health problems than someone who is slim and inactive! (PPH, 2010)

The two cities also differed in the ways they discussed why excess body weight may be detrimental for health. Hamilton largely focused on the physical health outcomes associated with obesity (e.g., diabetes, cardiovascular disease) while Mississauga largely focused on social and mental impacts of being obese (e.g., depression, low self-esteem). Further, the discourse greatly differed when discussing the social impacts of obesity:

> [Obese children are at risk for] social discrimination by their peers and adults, which can lead to poor self esteem… overweight kids may also experience poor body image and have trouble making friends. (HPHW, 2010)

> Size prejudice hurts all children, not just those who are large. (PPH, 2010)

Hamilton depicts the discrimination faced by obese youth as an outcome of their excess body weight, something they put themselves 'at risk' for by being obese. Conversely, Peel discusses size prejudice as being an external force that is applied to (not caused by) youth with various body sizes. The individual's involvement in their own suffering is viewed very differently in both cities.

Table 5- Determinants of Obesity according to Key Informants in Mississauga

Major themes	Sub-themes	Comments
Mississauga		
Physical environment	Availability of unhealthy food	"When new families come over, they often think that our ready-made packaged foods are wonderful, because they don't have that back home…"
	Built environment	"We are a very car reliant community because we are so large…it is very difficult for people to get to one part of the city to another, certainly by walking. We have some connection issues."
	Availability of physical activity resources	"There is a community centre, fitness centre and a swimming pool too. Everything is central in this area. If someone wanted to work out, there is no excuse for them not to. They could do it."
	Culturally appropriate activity resources	"There used to be a standard: you get a baseball diamond, soccer pitch, and typical play structure. Now the thinking is more "maybe we need a bocce ball field and cricket pitch in this community…"
Economic environment	Cost of nutritious food	"Kids are coming to school without lunch, or only with a couple of dollars and if you go into a high school cafeteria, what is cheap? Fries, Jamaican paddies, pizza slices…"
	Cost of recreational programs	"From what the community says, it is a lot of money to use all the fitness services in this area…"
	Financial priorities	"One parent will migrate, find a job, and then bring the family over. But then they really can't afford to have their families here because housing in the area is very expensive, plus food and clothes..."
Socio-cultural environment	Cultural foods	"We do a lot of workshops about what a portion size would look like for a typical five year old and it is hard to translate to a curry because the vegetables and the meat are all mixed together…"
	Excess portion sizes	"People come over and all of a sudden portions are much bigger….A bagel is a big serving size here."
	Feelings of safety	"If you are not feeling safe in your community, you are not out with your children walking or riding your bikes."
	Role-modeling healthy behaviour	"I think adults have to be better role models because they say, "You should eat this" as they are walking around with their [coffee and donuts]."
		"We need better role models for girls in physical activities. In hockey, you look at the guys' teams and you know the girls' teams don't get the same press coverage…"

Table 6- Determinants of Obesity according to Key Informants in Hamilton

Major themes	Sub-themes	Comments
Hamilton		
Physical environment	Access to amenities	"I think of environmental diversity here, we have such variety. We are not living in a concrete jungle. We have the waterfront. We have the escarpment. We have a great parks system."
	Increased access to foods	"I don't believe that there are any barriers for anybody in this city. You have access say to a variety of food. You have access to so many trails. We have so many things here. I don't believe there is any excuse. It becomes an individual responsibility at that point."
		"We are constantly presented with abundance. There is always plenty of food available. You can call up food from around the world. Historically, this wasn't the case…"
	Lack of access to food	"This area has a bad grocery store situation. There are not a lot of them. People are buying their groceries at convenience stores… as far as fresh fruits and vegetables, there is not a lot of that happening".
	Education & Awareness	"I mean many parks and trails here are heavily used… It is an educational thing for others. If you are not aware that is exists, it might not exist."
	Pollution	"I don't want to black ball Hamilton but we have a lot of industry here, and it is more difficult for residents to be active here because of the air. "
Economic environment	Cost of nutritious food	"If we have the highest level of poverty in Ontario here, then of course the access to healthy nutrition is impacted by living in Hamilton."
	Financial agenda	"A lot of the kids have to work after school, so things like extracurricular activities are not even an option."
	Poverty	"Obesity could be related to poverty in a way that I don't buy myself, because you are poor, you don't have access to good food. I think you buy into junk food, because it is more accessible."
		"If you put money in the hands of the people who need it most, they are going to spend to ensure that they have things like education and adequate nutrition… But when you talk to some middle class people often they say, 'Oh yeah, they will just spend it on beer'. You know that attitude, blaming the poor for being poor."
		"There are health issues, and this includes obesity, for people who are vulnerable to low-income. Giving them more money should help but then I don't know because I see them carrying cases of beer on days that welfare comes out…"
Socio-cultural environment	Norms around healthy living	"Physical activity is part of a lifestyle. Their parents don't deem it as important, and so the kids don't see it as important."
		"The number of people who now cannot cook, literally do not know how to cook the basics, is alarming… Kids don't see food being prepared in the home."
	Advertisements	"We are bombarded with advertising for the tons of crap out there for kids to eat, and they do eat it, because it tastes good even though it isn't healthy."

Determinants of Obesity

Key informants in both cities most commonly discussed attributes of the physical environment as determinants of obesity, followed by the economic environment and then socio-cultural environment (Tables 5 & 6). None of the key informants discussed the political environment as a determinant.

In Mississauga, active transportation in the sprawling city was viewed as inhibiting physical activity while access to affordable food, particularly for newcomer and low-income populations, was impeding healthy diets. One determinant unique to the City of Mississauga was the diverse population (Table 5). Specifically, planning public health programs to target the many cultural foods and food preparation styles was viewed as challenging, while planning recreational space to encompass a broad range of physical activities (i.e., soccer and cricket) was also viewed as limiting physical activity.

In Hamilton (Table 6), the city's urban design was seen as both health-promoting and inhibiting. On one hand, key informants discussed Hamilton's natural landscape as being beneficial for increased physical activity, while on the other hand 4 out of 5 key informants discussed barriers to accessing those physical activity opportunities (e.g., cost, pollution). Additionally, there was discrepancy about whether increased access to food existed in all areas of the city, and whether this abundance was beneficial for health (i.e., increased access to fruits and vegetables) or detrimental (i.e., access to pre-packaged foods).

In contrast to the key informants' focus on physical environmental determinants of body weight, the public health websites focused more on socio-cultural environments.

For instance, a major reason for increased body weight was societal lifestyle changes:

> Food portions have become super sized and we often eat on the run instead of taking time to enjoy family meals… kids are less active and fewer of them play outside anymore. (HPHW, 2010)

> The rapidly increasing rate of childhood obesity in Canada is a symptom of underlying problems in our 21st Century lifestyle. Our children did not create these problems but they are paying the price, both emotionally and physically. (PPHU, 2010)

It is apparent that both cities have very different perspectives on what/who are responsible for adopting negative lifestyle patterns. Hamilton views the families' inability to sit down for dinner and kids' lack of outside play as causes of increased obesity. The onus is implicitly on the individuals for not engaging in a healthy lifestyle. In contrast, Peel explicitly states that the lifestyle change is part of a bigger national societal change that youth are not responsible for but victims of, suggesting they have little choice over what happens to their bodies.

Both the key informants and websites suggest 'time' as another relevant determinant of obesity. Specifically, the change in knowledge and practice over time has resulted in the creation of environments that do not support healthy lifestyles. As both website quotes state, the '21st Century lifestyle' has shaped bodies by changing and normalizing certain lifestyle behaviours. This includes a shift towards more sedentary and technology-based activities (e.g., working on the computer, watching television), more pre-prepared food that is less nutritious and served in larger portions (e.g., super-sized meals at fast food restaurants), as well as reduced opportunities for physical activity (e.g., car reliance, less physically laborious work). Moreover, key informants from both cities

acknowledged the important role of urban planning in designing healthy cities; yet, what is considered healthy has changed over time:

> What people thought was healthy has changed. Health was always a consideration but there was a time when we thought doing reverse frontage lots and the cul-de-sacs was protecting communities from through traffic. By having these little dead end streets, we thought that was healthy. Safety was a big issue then, traffic safety was healthy… Our thinking now is changing and those things aren't enough, and in fact they are barriers to good health… the way we look at health has changed. (Mississauga KI-4)

Understanding the previous beliefs and practices, particularly in fields that require long-term planning and development such as urban design, are especially important for complex population-health outcomes like obesity.

Planning Ahead: Modifying Obesogenic Environments

Both cities stated in their anti-obesity strategies that modifying environments was a future priority. In Mississauga this was echoed by key informants who outlined the city's strategies for doing this, largely focusing on improving active transport. Additional strategies included policies created by the public planning department that require new developments to utilize a mixed land use design so that residents are close to commercial opportunities (e.g., shopping) in addition, any changes to the existing environments must incorporate mixed land use ('forcing the mix' as one key informant stated). Further modifications are being made to older neighbourhoods in order to make 'strong nodes and corridors' so that these communities are self-sufficient and will allow residents to get central services without having to travel across the city. This goal to create strong neighbourhoods and increase active transportation (e.g., walking) was a major priority in the city's 40-year strategic plan, which key informants expect will progress because of its

prominence in the plan. Additional suggestions for obesity-related initiatives put forth by key informants focused on the political environment. For instance, encouraging school boards to implement better nutrition policies for food sold on-site, and requesting support from the provincial and federal governments for the rapid population growth, specifically to accommodate newcomer populations, are examples of such initiatives.

In the much older City of Hamilton, it was noted that major modifications to the built environment would be more of a challenge due to older city design. Yet, Hamilton had implemented some strategies to modify the built environment, such as refurbishing run down playgrounds with new outdoor fitness equipment. However, the majority of initiatives in effect were targeted towards helping specific populations deal with obesogenic environments. Some of these initiatives included encouraging a healthy snacking program to coaches of youth sports teams, offering grocery vouchers to low income families, and setting up healthy eating action teams in school to promote healthy cafeteria options.

The role of poverty as a determinant of obesity was acknowledged as important to all key informants, although it was never explicitly discussed in either the city or public health strategic plans. This knowledge certainly reflects the importance of this issue in Hamilton where the health disparity between the city's richest and poorest communities results in a 20-year difference in life expectancy (Buist, 2010). However, there was much discrepancy among key informants about the best way to deal with poverty as it relates to health and body weight. One key informant suggested that the provincial government create a livable wage policy to support low-income populations. Hamilton does have

organizations that focus on issues of poverty in the City of Hamilton (e.g., Hamilton Roundtable for Poverty Reduction) and more input from these experts would be especially beneficial when looking to modify low-income neighbourhood environments in relation to obesity.

While they were not probed to discuss the relevance of upstream factors that affect obesity rates, key informants in both cities acknowledged the importance of policies that indirectly influence population body weight including population growth, poverty, school nutrition and urban design. In general, these observations tended to reflect the key informants' areas of expertise (e.g. vice principals spoke about school nutrition, urban planners spoke about city design). Such policies are undoubtedly important, albeit unintentional, factors that contribute to body weight, and clearly highlight the complexity of the obesity epidemic.

Discussion and Conclusions

As obesity rates continue to rise despite the abundance of research on individual-level determinants of body weight, there is a growing recognition of the importance of population-level and environmental factors that contribute to what has been referred to as a public health crisis. This research sought to examine the role of socio-cultural and political environments in constructing obesogenic micro-environments. In doing so, municipal policies and practices relating to obesity were examined in two unique Canadian urban settings.

Summary & Relevance of Findings

The findings revealed that the two cities took very different approaches in prioritizing health and obesity. Mississauga sought to maintain its healthy reputation by incorporating health into all of its strategic goals. Key informants were aware of the city's health priorities and discussed the centrality of a healthy population to the well-being of the city. The Peel Region's anti-obesity strategy also reflects this mind-set by taking a preventative approach to obesity in seeking to modify the environment and ultimately make change at a larger population-level. Additionally, the website discourse focused on social determinants of obesity and almost completely ignored any role for individuals to make decisions about health for themselves. The environment was depicted as largely deterministic by the city, which suited their perspective that health is encompassed in everything, as well as their priority to maintain a healthy city.

Hamilton's reputation as an industrial and therefore unhealthy city was evident throughout. The explicit inclusion of health as a strategic goal and the focus on air quality as a major health priority were evidence of the city trying to overturn this image. Hamilton took a more individual approach to obesity consistent with moralizing and 'blame the victim' discourse (Gard & Wright, 2005; LeBesco, 2004). This was seen by their focus on obesity as resulting from individuals who have made unhealthy choices (i.e., not utilizing available opportunities, spending money on unhealthy foods, choosing to not sit down for family meals). This supports the belief that obese individuals are flawed and lack self-control (Crandal & Schiffhauer, 1998 & Evans, 2006). By fixing these 'sick' individuals, the city can become a healthy community as set out in its

strategic plan.

What was particularly salient in the findings was the pervasiveness of city-wide values and attitudes towards health in general and obesity in particular. The healthy versus unhealthy perceptions in both cities influenced how they framed the obesity-epidemic (as shaped by individual and/or environmental factors), and determined which policies were suggested or implemented (e.g. targeting at-risk populations versus the entire population). Moreover, these attitudes and perceptions of health were common across strategic plans, public health websites and key informants within each city. This suggests that the socio-cultural and political environments operate concomitantly. The values and beliefs about obesity held by key informants and policy-makers influence the ways in which they choose to deal with the obesity-epidemic. Similarly, the policies and priorities set by city officials almost always serve to reconstitute those same values. Moreover, the values and policies evident in these two cities influenced how physical environments were to be modified (e.g., Mississauga's 'force the mix' policy will influence future urban land use and neighbourhood design), and economic environments mitigated (e.g., Hamilton offering grocery store vouchers for those in low-income communities to be able to afford food). It is worthwhile to acknowledge the vastly different political and economic landscapes of the two cities, which account for their ability to immediately deal with the obesity epidemic. For instance, Mississauga, with its political and economic stability, is able to undertake initiatives that include larger scale modifications that requiring time, money and government longevity to see them through to completion. Thus, the findings suggest an interaction not just between socio-cultural

and political environments but physical and economic environments as well.

Similar to findings of other research (Kirk, Penney & McHugh, 2010; Raine et al., 2008), the political environment was overlooked as a relevant determinant of obesity by key informants. Instead, political factors were discussed as a means of correcting those problematic determinants found in the physical and economic environments. For instance, the discussions of poverty in Hamilton and serving multicultural populations in Mississauga were suggested as areas where local and provincial government interventions were needed. Overall, the role of the city as a decision-making body and site for dissemination of knowledge was not at all discussed as being important to the current obesity-epidemic, a finding which raises concerns. The official discourse of a city (disseminated through policy documents, policy-makers, public health websites) is important not just in shaping local policies and practices as evident from this study, but also because 'official' discourse is weighed heavily by the lay population and is powerful in influencing their perspectives (Lupton, 1995). When the dominant discourse problematizes certain individuals as deviant, immoral and unhealthy because of their behaviour and/or body size, this serves to only further stigmatize obese individuals and often results in the oversight of other factors central to the current obesity epidemic (Campos et al., 2004; Monaghan, 2005). Without knowledge of their power to influence public opinion and potentially behaviour, policy- makers risk ignoring the very importance of socio-cultural and political environments in shaping the health of populations.

These two cities were chosen for this study due to their differences in terms of obesity rates as well as socio-cultural and political characteristics but also because of their similarities in that they are both shaped by the same regional, provincial and national policies. However, systematic investigation of these provincial and national policies was beyond the scope of this particular paper, although they are important areas for future research.

Additionally, there was very little discussion in the policy documents and by key informants about managing the food industry in the cities. This absence may be in part due to the perception that these practices are beyond the control of the key informants interviewed. While municipal public health units are responsible for assessing the health standards of retail food outlets, this is primarily for food handling and preparation rather than the healthfulness of menu items. It would be useful for future studies to examine the role of municipalities in shaping the local food environment by assessing both the political and physical environments. As the ANGELO Framework suggests, examining various environmental types and scales are important for understanding the complexity of the obesity epidemic.

Theoretical Contributions

In order to understand the role of environmental factors as contributing to the prevalence of obesity, this paper utilized the ANGELO Framework as a conceptual tool for 'dissecting obesogenic environments' (Swinburn, Egger & Raza, 1999). Within the literature there appears to be a lack of consistency in both definition and analyses of environments as they relate to obesity. This is particularly problematic when attempting

to develop best practices for modifying environments and ultimately curbing the increasing rates of obesity (Kirk, Penney & McHugh, 2010; Townsend & Lake, 2009). Although the ANGELO Framework has been widely cited as a potentially useful tool, it has generally been under-utilized as a way of theorizing environmental determinants of obesity (but see systematic and scoping reviews: Ferreria, 2007; Kirk, Penney & McHugh, 2010; Raine et al., 2008; Van der Horst, 2007; Wendel-vos et al., 2007).

The appeal of this framework is its comprehensiveness whilst maintaining simplicity, which allows for a broad range of complex environmental factors at various scales to be considered at once. For the purpose of this research, the framework was helpful in situating municipal policies/practices and official discourse on obesity (factors previously overlooked in the literature) within the scope of 'obesogenic environments'. However, as noted above, one major challenge of utilizing the ANGELO Framework was that there is more overlap and interaction between the environments than alluded to in the clearly defined boundaries of the authors' analysis grid (Swinburn, Egger & Raza, 1999).

Policy Implications

Some key informants highlighted additional factors beyond individual physical activity levels and diet in determining obesity in the city. Namely, structural barriers (e.g., poverty, culture) were viewed as important determinants of obesity as they limited the amount of agency an individual had to make lifestyle choices, yet none of the policy documents or initiatives attempted to deal with these upstream determinants of health. Analyses of specific polices on poverty reduction, school nutrition, demographic change, among others were beyond the scope of this paper; however, their centrality was certainly

evident in the key informant discussions.

Upstream social factors determine other health disparities in addition to obesity, and contribute to health-inhibiting environments rather than solely obesogenic environments. Taking the lead from Frohlich, Ross & Richmond (2006), it is recommended that "policies with a focus on the alleviation of health disparities focus more on the determinants of health disparities in Canada (and elsewhere), rather than on just the disparities in health themselves" (pg. 140). Thus, looking to tackle poverty and cultural barriers to health (among other social determinants) will not only result in improvements in prevalence of obesity but other health outcomes as well.

Conclusions

Local environments do not exist in a vacuum but rather are shaped by the physical, economic, socio-cultural and political conditions of the cities, regions, provinces, and nations in which they are located. To date, urban obesity research has largely ignored the importance of socio-cultural and political environmental factors that shape this global epidemic. As evident in this study, such factors are powerful in shaping obesogenic environments and need to be more critically examined by researchers and policy-makers alike. Doing so will allow for a better understanding of the process of producing unhealthy environments and how we might de/re-construct them in the future.

References

Badland, H., Schofield, G., Witten, K., et al. (2009). Understanding the relationship between activity and neighbourhoods (URBAN) Study: research design and methodology. *BMC Public Health,* 9, 224-235.

Berkman, L, Kawachi, I. (2000). *Social Epidemiology*. New York: Oxford University Press.

Booth, K., Pinkston, M., Poston, W. (2005). Obesity and the built environment. *Journal of the American Dietetic Association,* 105, S110-S117.

Buist, S. (2010). Code Red: Where you live affects your health. *The Hamilton Spectator* Website. http://www.thespec.com/sections/codered Updated April 10-16, 2010. Accessed June 29, 2010.

Campos, P., Saguy, A., Ernsberger, P., Oliver, E. & Gaesser, G. (2006). The epidemiology of overweight and obesity: public health crisis or moral panic? *International Journal of Epidemiology*, 35(1); 55-60.

Carver, A., Timperio, A. & Crawford, D. (2008). Playing it safe: The influence of neighbourhood safety on children's physical activity- A review. *Health and Place*, 14(2), 217-227.

City of Hamilton. Urban Hamilton Official Plan. (2009).Website. http://www.hamilton.ca/CityDepartments/PlanningEcDev/Divisions/StrategicServicesSpecialProjects/Policy+Planning/HamiltonNewOfficialPlan/UrbanArea.htm. Accessed June 25, 2010.

City of Hamilton. Public Health Services Strategic Plan (2007). Website. http://www.hamilton.ca/NR/rdonlyres/DE97327C-3385-40B4-953C-45FBE064C667/0/PublicHealthStratPlan.pdf Accessed June 21, 2010.

City of Mississauga. (2008). Awards for 2007. Website. http://www.mississauga.ca/file/COM/Report_Awards.pdf. Accessed July 12, 2010.

City of Mississauga. (2009). Strategic Plan: Our Future Mississauga. Website. http://www.mississauga.ca/portal/discover/ourfutureplan. Accessed June 25, 2010.

Curtis, S. & Taket, A. (1995). *Health and Societies: Changing Perspectives*. London: Arnold.

Crandall, C., & Schiffhauer, K. Anti-fat prejudice: beliefs, values, and American culture. *Obesity Research,*6(6), 458-460.

Davison, K. & Birch, L. (2001). Childhood overweight: A contextual model and recommendations for future research. *Obesity Reviews,* 2(3), 159-171.

Dyck, R., Klomp, H. & Tan, L. (2001). From 'thrifty genotype' to 'hefty fetal phenotype': The relationship between high birth weight and diabetes in Saskatchewan Registered Indians. *Canadian Journal of Public Health,* 92(5), 340-344.

Egger, G. & Swinburn B. (1997). An 'ecological' approach to the obesity pandemic. *British Medical Journal*, 315, 477-481.

Ellaway, A., Anderson, A. & Macintyre S. (1997). Does area of residence affect body size and shape? *Journal of Obesity and Related Metabolic Disorders,* 21, 304-308.

Evans, B. (2006). 'Gluttony or sloth': critical geographies of bodies and morality in (anti)obesity policy. *Area,* 38(3); 259-267.

Evans, R.G., Barer, M.L., & Marmor, T.R.E. (1994). *Why are Some People Healthy and Others not? The Determinants of Health of Populations*. New York: Aldine Transaction;

Fairclough, N. (1989). *Language and Power.* London: Longman.

Farmer, T., Robinson, K., Elliott, S.J. & Eyles, J. (2006). Developing and implementing a triangulation protocol for qualitative health research. *Qualitative Health Research*, 16(3); 377-394.

Ferreira, I. (2007). Environmental correlates of physical activity in youth – a review and update. *Obesity Reviews,* 8, 129–154.

Frohlich, K., Ross, N. & Richmond, C. (2006). Health disparities in Canada today: Some evidence and a theoretical framework. *Health Policy,* 79, 132-143

Gard, M. & Wright, J. (2005). *The Obesity Epidemic: Science Morality and Ideology.* London: Routledge.

Hamilton Partners for Healthy Weights. (HPHW) (2007). Website. http://www.dailythingscount.ca/index.html Accessed on June 29, 2010.

Hamilton Public Health Services. (HPHS) (2010). Website. http://www.hamilton.ca/HealthandSocialServices/PublicHealth/ Accessed June 20, 2010.

Harrington, D. & Elliott, S.J. (2009). Weighing the importance of neighbourhood: a multilevel exploration of the determinants of overweight and obesity. *Social Science & Medicine*. 68: 593-600.

Janssen, I., Boyce, W., Simpson, K. & Pickett, W. (2006). Influence of individual-and area-level measures of socioeconomic status on obesity, unhealthy eating, and physical inactivity in Canadian adolescents. *American Journal of Clinical Nutrition,* 83, 139-145.

Katzmarzyk, P. T. & Ardern, C. I. (2004). Overweight and Obesity Mortality Trends in Canada, 1985-2000. C*anadian Journal of Public Health,* 95(1);16-20.

Katzmarzyk, P.T. & Janssen, I. (2004). The economic costs associated with physical inactivity and obesity in Canada: An update. *Canadian Journal of Applied Physiology*, 29(1); 90-115.

King, T., Kavanagh, A., Jolley, D., Turrel, G. & Crawford D. (2006). Weight and place: a multilevel cross-sectional survey of area-level social disadvantage and overweight/obesity in Australia. *International Journal of Obesity*, 30, 281-287.

Kirk, S., Penney, T. & McHugh F. (2010). Characterizing the obesogenic environment: the state of the evidence with directions for future research. *Obesity Reviews,* 11, 109-117.

Latham, J. & Moffat, T. (2007). Determinants of variation in food cost and availability in two socioeconomically contrasting neighbourhoods of Hamilton, Ontario, Canada. *Health & Place,* 13: 273-287.

LeBesco K. (2004). *Revolting Bodies: The Struggle to Redefine the Fat Identity*. Boston: University of Massachusetts Press.

Lupton, D. (1995). *The imperative of health: Public health and the regulated body*. London: Sage Publications.

Mobley, L., Root, E., Finkelstein, E., Khavjou, O., Farris, R. & Will, J. (2006). Environment, obesity, and cardiovascular disease risk in low-income women. *American Journal of Preventative Medicine*, 31, 109-117.

Monaghan, L. (2005). Discussion Pieces: A Critical take on the Obesity Debate. *Social Theory & Health,* 3, 302-314.

Papas M., Alberg A. Ewing R., Helzlsouer K. J., Gary T. & Klassen A.C. (2007). The built environment and obesity. *Epidemiologic Reviews*, 29(1); 129-143.

Patton, M. (2002). Q*ualitative Research & Evaluation Methods.* London: Sage Publications.

Pearce, J., Witten, K., Hiscock, R. & Blakely, T. (2007). Are socially disadvantaged neighbourhoods deprived of health-related community resources? *International Journal of Epidemiology*, 36(2); 348-355.

Peel Public Health Unit. (2010). Website. http://region.peel.on.ca/health/ Updated 2010. Accessed June 20, 2010.

Procter, K. (2007). The aetiology of childhood obesity: a review. *Nutritional Research Review*s, 120, 29-45.

Raine, K., Spence, J., Church, J., et al. (2008). *State of the evidence review on urban health and healthy weights*. Ottawa: Canadian Institute for Health Information.

Region of Peel. (2009). 2009-19- Staying Ahead of the Curve: Peel Public Health's 10-year Strategic Plan. Website. http://www.peelregion.ca/health/health-status-report/stay-ahead-curve/ Accessed June 21, 2010.

Region of Peel. (2010). Child Obesity Website. https://region.peel.on.ca/health/obesity/ Updated 2010. Accessed on June 29, 2010.

Robert, S. & Reither, E. (2004). A multilevel analysis of race, community disadvantage, and BMI among adults in the US. *Social Science & Medicine,* 59, 2421-2434.

Shields, M. (2005). *Measured Obesity: Overweight Canadian children and adolescents.* Nutrition: Findings from the Canadian Community Health Survey, Statistics Canada,

Stafford, M., Cummins, S., Ellaway, A., Sacker, A., Wiggins, R. & Macintyre, S. (2008). Pathways to obesity: Identifying local, modifiable determinants of physical activity and diet. *Social Science and Medicine, 65,* 1882-1897.

Statistics Canada. (2007). *2006 Canadian Census.* Ottawa, Ontario.

Statistics Canada. (2005). *Canadian Community Health Survey: Cycle 3.1*. Ottawa, Ontario.

Swinburn, B., Egger, G., & Raza, F. (1999). Dissecting Obesogenic Environments: The development and application of a framework for identifying and prioritizing environmental interventions for obesity. *Preventive Medicine,* 29, 563-570.

Taylor, J., Evers, S. & McKenna, M. (2005). Determinants of healthy eating in children and youth. *Canadian Journal of Public Health,* 96(3); S20-S26.

Timperio, A., Salmon, J., Telford, A. & Crawford, D. (2005). Perceptions of local neighborhood environments and their relationship to childhood overweight and obesity. *International Journal of Obesity.* 29, 170-175.

Townshend, T. & Lake, A.A. (2009). 'Obesogenic urban form: theory, policy and practice'. *Health and Place,* 15(4); 909-916.

Tucker, P., Irwin, J., Gilliland, J., He, M., Larsen, K & Hess P. (2009). Environmental influences on physical activity levels in youth. *Health and Place,* 15(1); 357-363.

Van der Horst, K., Oenema, A., Ferreira, I., et al. (2007). A systematic review of environmental correlates of obesity-related dietary behaviours in youth. *Health Education Research,* 22(2); 203-226.

Vanasse, A., Demers, M., Hemiari, A. & Courteau, J. (2006). Obesity in Canada: where and how many? *International Journal of Obesity,* 30, 677-683.

Wakefield, S. & McMullan C. (2005). Healing in places of decline: (re)imagining everyday landscapes in Hamilton, Ontario. *Health and Place*, 11(4); 299-312.

Wendel-Vos, W., Droomers, M., Kremers, S., Brug, J. & Van Lenthe, F. (2007). Potential environmental determinants of physical activity in adults: a systematic review. *Obesity Reviews,* 8, 425–440.

Willms J., Tremblay M. & Katzmarzyk, P. (2003). Geographic and Demographic Variation in the Prevalence of Overweight Canadian Children, *Obesity Research*, 11, 668-73.

Wodak, R. (2009). What is critical discourse analysis about? In: Wodak R, Meyers M, eds. *Methods of Critical Discourse Analysis*. London: Sage Publications.

World Health Organization. (WHO) (2000). *Obesity: Preventing and Managing the Global Epidemic,* WHO Technical Report Series: 894, Geneva, Switzerland.

World Health Organization. (WHO) (2010). Urban Health: Healthy Cities. Website. http://www.euro.who.int/en/what-we-do/health-topics/environmental-health/urban-health/activities/healthy-cities Accessed August 13, 2010.

Yach, D., Stuckler, D. & Brownell, K. D. (2006). Epidemiologic and economic consequences of the global epidemics of obesity and diabetes. *Nature Medicine, 12*(1): 62-67.

Zenk, S., Schulz, A., Israel, B., James, S., Boas, S. & Wilson M. (2005). Neighbourhood racial composition, poverty and the spatial accessibility of supermarkets in metropolitan Detroit. *American Journal of Public Health,* 95, 660-667.

CHAPTER THREE

Census tracts, place names and postal codes, oh my: Examining neighbourhood boundaries useful in research with adolescents

Authors: Jennifer Asanin Dean, PhD Candidate[1], Susan J. Elliott, PhD[2]

[1]School of Geography & Earth Sciences, McMaster University
Hamilton, ON, Canada

[2]School of Public Health & Health Systems, University of Waterloo
Waterloo, ON, Canada

Manuscript to be submitted to: The Canadian Geographer

Correspondence and reprint requests:

Jennifer Asanin Dean
School of Geography and Earth Sciences, McMaster University
1280 Main St. W., Hamilton, ON, L8S 4K1
Tel: 905-525-9140 ext. 20440 Email: asaninjl@mcmaster.ca

Abstract

The importance of neighbourhoods as contexts influencing human behaviour has a substantial legacy in geography. However, there is a lack of consensus about how best to define neighbourhood boundaries for research. This study examines the definition and use of neighbourhood space among the adolescent population. Using in-depth interviews and community mapping, this research assesses the interpretation and use of neighbourhood space by 31 adolescents in two low- SES areas in Southern Ontario. Participants' conceptual neighbourhoods are compared with more commonly used neighbourhood boundary measures including census tracts, forward sortation areas and place names. Additionally, the factors and amenities that influence adolescents' use of neighbourhood space are discussed. The importance of population-specific and place-specific definitions of neighbourhood is highlighted in addition to methodological implications.

Introduction

The importance of neighbourhoods as contexts influencing human behaviour has a substantial legacy in geography, and has occupied researchers in many sub-fields of the discipline. Among health geographers, for instance, place is now widely regarded as a determinant of population health, and has resulted in a rapidly growing body of research aimed at 'unpacking the black box' of area effects on health (Diez Roux, 2001; Kawachi & Berman, 2003; Macintyre, Ellaway & Cummins, 2002; Pickett and Pearl, 2001). Within this literature, local environments, namely neighbourhoods, have been acknowledged as important settings that shape the health of residents.

To provide another example, urban geographers examining ethnic segregation, ghettoization, and other geographic inequalities rely on neighbourhoods as a unit of analysis (Bauder & Sharpe, 2002; Hiebert, 2002; Johnston; Forrest & Poulsen, 2002; Walks & Bourne, 2006). This is due in large part to the homogenous nature of such small-scale environments, which helps to identify areas with particular characteristics (e.g., high crime rate, low-income) and certain spatially clustered populations (e.g., recent immigrants, visible minorities).

Regardless of empirical interest, a particular challenge shared by researchers is that there is little consensus regarding how to best define 'neighbourhood'. In fact, many argue that using inappropriate definitions of neighbourhood can mask important contextual effects. As the classic 'modifiable areal unit problem' (MAUP) suggests, changing the size (i.e., scale effect) and/or the boundaries (i.e., zonation effect) of a

spatial unit can alter the relationship between place and the outcome of interest (Openshaw, 1984).

To date, a number of methods for defining neighbourhood have been postulated including the use of administrative boundaries (i.e., census tracts, postal codes, city wards) (Bauder & Sharpe, 2002; Harrington & Elliott, 2009), place-names (Brower, 1996; Ross et al., 2004), boundaries set by physical features (i.e., railway tracks) (Bullen, Moon & Jones, 1996), service-dependent areas (Asanin Dean & Wilson, 2009), social interaction centered areas (Deitz, 2002), homogeneous areas based on social observation (Schaefer-McDaniel, Dunn, Minian & Katz, 2010), buffer zones/areas surrounding participants' homes (Kaczynski et al., 2009; Pouliou et al., 2011), as well as other customized approaches (Luginaah et al., 2004).

Many conceptualizations of neighbourhood have been deemed problematic because of the arbitrary nature in which boundaries are drawn, as stated by Flowerdew, et al. (2008): "there is little reason to expect neighbourhoods to follow [administrative] boundaries and even less reason to expect diseases to respect these same administrative boundaries" (pg. 1243). Additional research on the activity patterns of residents has found that their daily activities often take them outside the administratively defined neighbourhood (Basta et al., 2010; Jones et al., 2010; Saarloos et al., 2009). In response to this, some researchers have advocated for the increased use of resident-defined neighbourhood boundaries (Coulton et al., 2001; O'Campo, Salmon, and Burke, 2009), which allow for a more accurate assessment of the contextual factors within the neighbourhood that residents come in contact with and are potentially influenced by.

To date, there have been relatively few studies that examine residents' perception of neighbourhood boundaries. A classic study by Guest & Lee (1984) found that definitions of neighbourhood were different even among residents living in the same spatial area. Further, the authors found that residents increasingly viewed neighbourhoods as a physical construct rather than a social one; a trend they stated was likely to continue. In a study of parents with young children, Coulton et al. (2001) found that perceptual neighbourhoods overlapped census tract boundaries although they were both similar in size. Moreover, there was discrepancy among participants in the same neighbourhood in terms of how that neighbourhood was defined (Coulton et al., 2001). To date, there is a lack of knowledge about how younger populations define neighbourhoods.

Children and adolescents spend significant amounts of time in their neighbourhood; many live, attend school and play within their local environment as their activity space is restricted by limited mobility and/or access to resources (Sellstom & Bremberg, 2006). Despite assumptions that youth are less likely to spend time outdoors in their neighbourhood due to the rise of technology (McNamee, 1998), engaging with public space is still an important aspect of childhood for many. Based on their 2008 study with British youth aged 10-16 Matthews et al. found:

> In contrast to those studies which have suggested that there has been a general retreat indoors by urban children, within the harsh and blighted neighbourhood settings… many young people relied heavily on outdoor space during their free time. (pg. 65)

In comparison to research with adult populations, neighbourhood perceptions and experiences of adolescents represent a small, albeit slowly growing, body of research. For instance, Basta and colleagues (2010) asked youth ages 15-18 to outline their

neighbourhood boundaries on a city map and then report daily activities with the aid of computer assisted GIS. Their findings revealed that none of the resident- defined neighbourhoods coincided with administrative boundaries, and that residents' daily activities took them out of and across the boundaries of both administratively defined and conceptual neighbourhoods (Basta et al., 2010). Given the importance of neighbourhood space to the adolescent population, understanding how youth define neighbourhood and engage with this environment is important for further examining potential contextual effects on adolescents' lives and behaviours.

As part of a larger research program examining the role of neighbourhood factors affecting adolescent body weight, the aim of this study is to provide a basis for interpreting the role of neighbourhood context in shaping adolescent health behaviours. This study focuses on how adolescent residents conceptualize and utilize neighbourhood space. Specifically, we compare residents' conceptual neighbourhoods with three commonly used neighbourhood boundaries in the literature (i.e., census tracts, postal codes and place name), and examine the spaces within these boundaries that participants engaged with.

Study Design and Methods

In this parallel case study, interviews and community maps were collected from adolescents living in low-socioeconomic status (SES) neighbourhoods in two Southern Ontario cities. Administrative boundaries (i.e., census tracts) were used to identify low-SES neighbourhoods in Hamilton and Mississauga, Ontario. There is little consensus

about how best to measure SES at the neighbourhood level (Pickett & Pearl, 2001), thus we captured neighbourhood status using 11 SES-related indicators (Table 1). Low-SES neighbourhoods were defined as having 9 of 11 variables falling one standard deviation or more below the mean, thus representing the most deprived neighbourhoods (relative to the city) for at least 80% of the variables. In Hamilton this resulted in four census tracts and two in Mississauga. In both cities the lowest-SES neighbourhoods were adjoining.

Table 1 - Neighbourhood Socio-economic Status Index

	Hamilton Neighbourhoods (n= 4)	**City of Hamilton** (n=122)	**Mississauga Neighbourhoods** (n=2)	**City of Mississauga** (n=125)
% population completed high school*	58.4	73	69.5	81.4
% population in labour force*	51	62.9	62.7	70.4
% population who are unemployed*	11.5	6.5	9	6.5
% lone parent families	33.6	19.4	14.4	15.4
Median household income ($)	27,255	55,900	48,810	76,110
Average household income ($)	37,070	66,465	56,200	91,110
Average dwelling value ($)	130,980	222,260	260,655	377,050
Average monthly rent ($)	599	776	778	1060
% families below the LICO	38.9	16.2	26.5	14
% families spending >30% of income on housing	37.6	23.7	35.21	26.2

Data source: Statistics Canada, 2006 Census Data
*Population aged 15 year or older

Adolescents (n=31) aged 13-18 (Table 2) living in these neighbourhoods were asked to take part in an in-depth interview, draw a map of their neighbourhood, and complete a short demographic survey. Participants were recruited using flyers (home delivery/ neighbourhood postings), information booths (set up at recreation centres, after-school programs and libraries), and snowball sampling (Patton, 2002).

Table 2- Socio-demographic profile of participants

	Hamilton	Mississauga	Total	%
Gender				
Female	13	11	24	77.4
Male	2	5	7	22.6
Age				
13	6	1	7	22.6
14	2	1	3	9.7
15	3	3	6	19.4
16	4	3	7	22.6
17	0	8	8	25.8
Country of Birth				
Canada	15	5	20	64.5
China	0	1	1	3.2
Pakistan	0	2	2	6.5
India	0	8	8	25.8
Length of time in country				
<2	0	3	3	9.7
3 to 5	0	5	5	16.1
> 5	0	3	3	9.7
Life	15	8	23	74.2

Interviews were held at participants' homes or in community spaces (e.g. library, recreation centre), lasted between 75-140 minutes and were audio recorded and transcribed verbatim. Participants were asked to discuss their neighbourhood characteristics, its positive and negative attributes, and suitability as a residence.

Interviews were coded using a thematic coding scheme facilitated by the use of NVivo, a qualitative software package, and analyzed using grounded theory (Strauss & Corbin, 1996).

To start the interview, participants were asked to sketch a map of their neighbourhood using blank letter-sized paper and a box of coloured pencils with the only requirement being that they include their home. Community mapping has been found to be particularly helpful when engaging youth in research (Amsden & VanWynsberghe, 2005; Santo, Ferguson & Trippel, 2010) and in this study was used both as a visual data collection tool and as an ice-breaker activity. Participants were asked to explain the contents of their map, to discuss what spaces they used most often (with whom and when) and to identify the places within their neighbourhood where they felt more or less comfortable.

Map content was used to determine how participants defined neighbourhood. Specifically, the participants' homes and other amenities were plotted using GIS software (ArcView), and conceptual neighbourhoods were created by interpreting the maps and creating convex hulls around points of interest. These conceptual neighbourhoods were compared to other commonly utilized neighbourhood boundaries including census tracts, forward sortation areas (first three digits of postal code), and municipally defined boundaries (place name). The total area of each conceptual neighbourhood as well as the distance from the participant's home to points of interest, were calculated. Maps were further analyzed by examining the most commonly and frequently mentioned points of interest. This study received ethical approval from McMaster University.

Results

Understanding Neighbourhood Characteristics

The majority of participants felt that their neighbourhood was a good place to live due to the availability of local amenities (e.g. recreation/community centres; shopping malls), and the large network of friends and family that also lived in the area:

> My friends live like five minutes away from me. My cricket club is so close to me, and the mall is here, and you can go buy anything… [This neighbourhood] is just a place where you can get each and every thing for like, living a normal life. Access to malls, bus stops, and even the walk-In clinic. You have got almost everything in this area. That is why I love this place. (Male, 17 years old, Mississauga)

The most frequently discussed negative attribute was safety. This was largely due to perceptions of crime as a result of illegal drugs in Hamilton and ethnic gangs in Mississauga:

> P: Well at times it is kind of hard [to live in the neighbourhood], because at one point we were living beside a crack house, so that was kind of hard, and then there's robberies and stuff going on, so that is not good, but overall I think it is a pretty good place to live.
>
> R: And how did you know it was a crack house?
>
> P: Because SWAT came and knocked down the door and gutted the house. (Female, 16 years, Hamilton)
>
> Overall it is a pretty good neighbourhood, except for all the crap, like drugs, violence, theft. (Female, 14 years, Hamilton)

Despite concerns over safety, 25 of the 31 participants felt that their neighbourhood was a good place for teenagers to live (the other 6 said their community lacked enough amenities (3), was too boring/quiet (2), and/or was too unsafe (1)).

The level of detail of each map varied between participants (Figures 1-3). Analysis revealed that age, migration status and level of mobility were predictive of the map contents. Older participants who had more experience being in the neighbourhood either through attendance at schools, greater social networks, and/or less restrictions on where they could go, had greater knowledge of their neighbourhood and its amenities. Their neighbourhoods subsequently tended to be bigger.

Migration status was important as participants who had only recently arrived in the country (and neighbourhood) had less knowledge of the community, despite their age. Similarly, participants who were less mobile (i.e., had grown up in the same neighbourhood) also had more knowledge of their neighbourhood and subsequently had larger conceptual neighbourhoods with more detail. Participants who were very mobile and had lived in numerous neighbourhoods within the city (often within the same section of the city) appeared to have larger neighbourhoods but with less detail.

Figure 1- Mississauga Neighbourhood Participant A (Female, 17 years old, in the country less than 1 year)

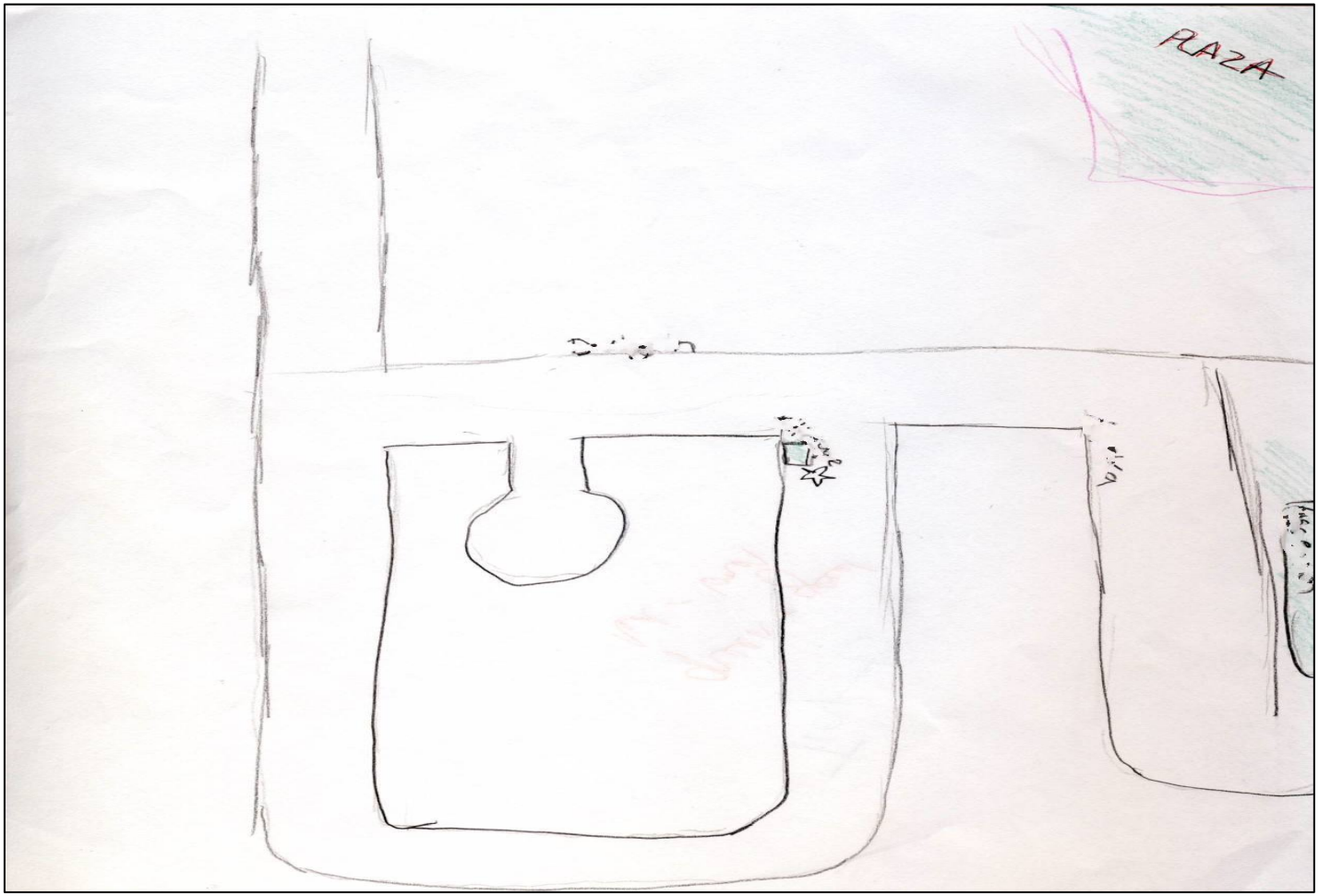


Figure 2- Mississauga Neighbourhood Participant B (Male, 16 years, grew up in city; in neighbourhood for ~2 years)

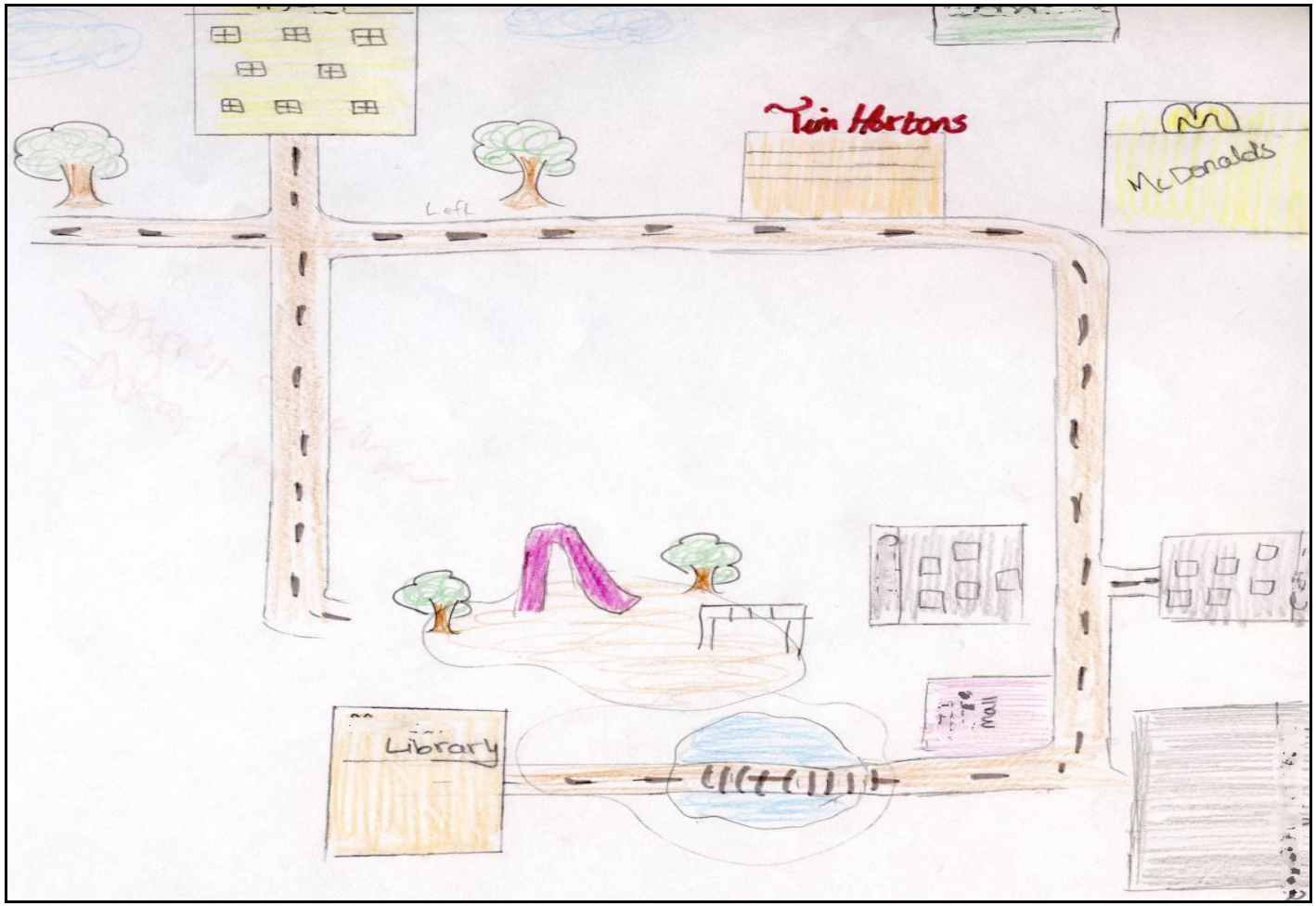


Figure 3- Mississauga Neighbourhood Participant C (Female, 15 years, grew up in neighbourhood)

Neighbourhood Size and Boundaries

When participants were asked about the size of their neighbourhood, most answered that it was 'big enough'. However, there was much variance in the size of neighbourhoods based on community maps. In the urban Hamilton neighbourhood, the size ranged from approximately 19,000 to 3,000,000 square metres, with the majority (10 of 15 participants) estimating their neighbourhood size at less than 500,000 square metres. In Mississauga, the range was even greater (approximately 14,000 to 9,000,000 square metres), and the neighbourhood size was larger overall at 1,000,000 square metres or larger. As a sprawling suburban community, it is not surprising that Mississauga's neighbourhood was viewed as larger, especially given the distance that participants needed to travel to get to amenities.

Participants' conceptual neighbourhoods were compared to three commonly used neighbourhood boundaries: forward sortation areas/postal code (FSA), municipal neighbourhoods/place name (PN) and census tracts (CT). The results differed between the two cities. (Two Mississauga neighbourhoods could not be coded due to lack of information). Overall, forward sortation areas appeared to be much larger than participants' conceptual neighbourhoods. In Hamilton, 11 (of 15) conceptual neighbourhoods fell within one FSA while one particularly large conceptual neighbourhood crossed the boundaries of three FSAs (Figure 4). In Mississauga, 12 (of 14) conceptual neighbourhoods fell within one FSA boundary, the two remaining crossed only two FSA boundaries (Figure 5).

Figure 4- Hamilton Forward Sortation Areas

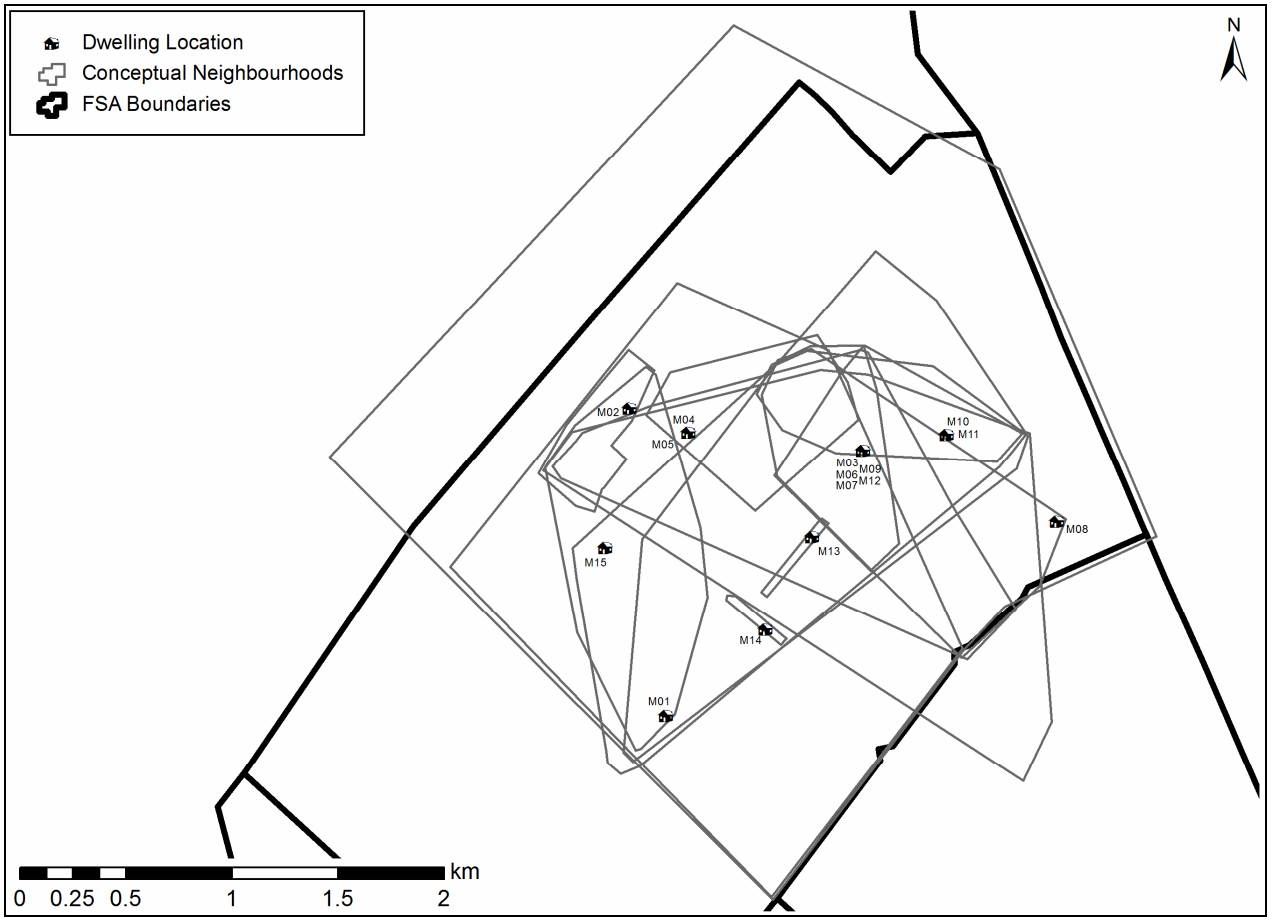


Figure 5- Mississauga Forward Sortation Areas

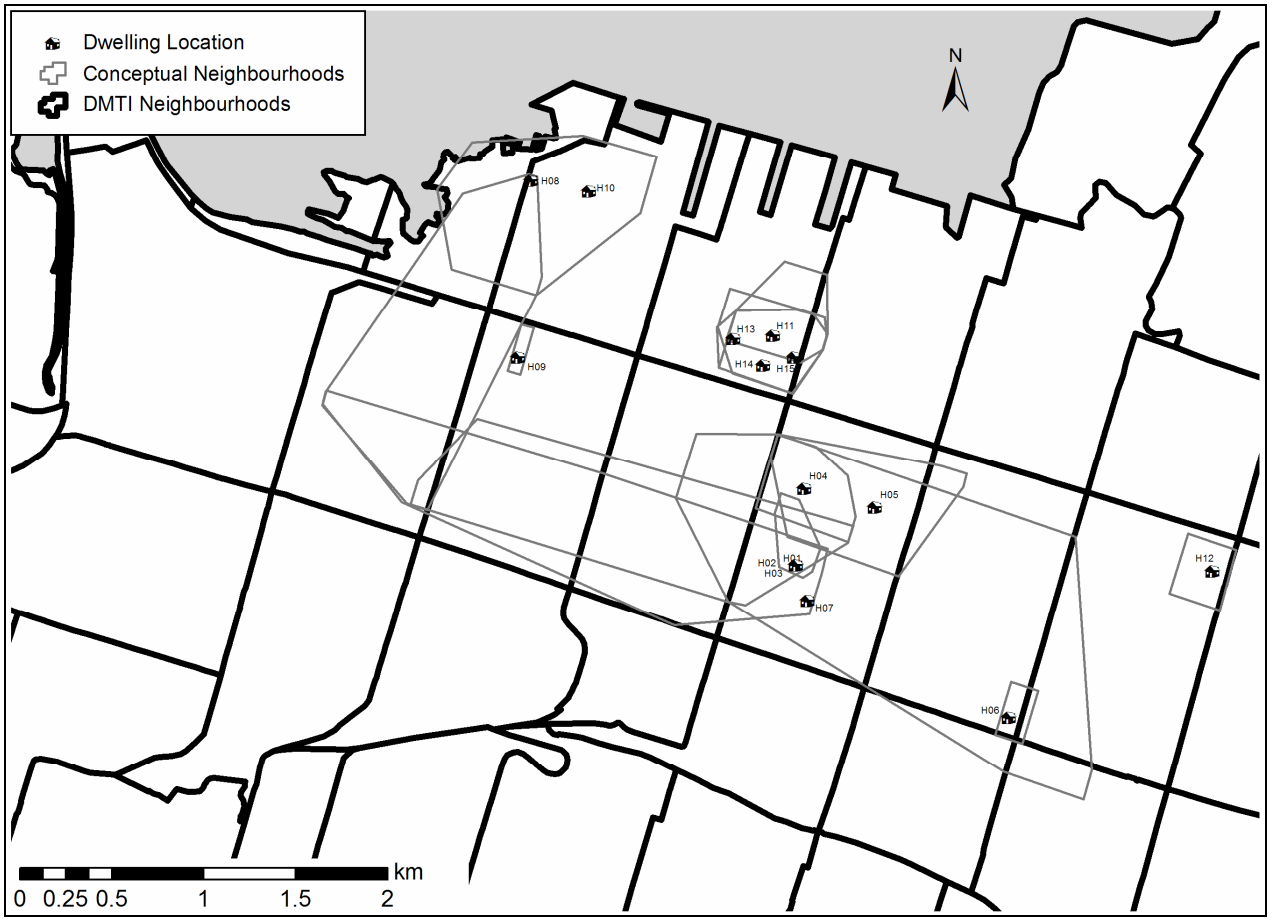


Figure 6- Hamilton Place Name Boundaries

Figure 7- Mississauga Place Name Boundaries

Figure 8- Hamilton Census Tract Boundaries

Figure 9- Mississauga Census Tract Boundaries

Place name boundaries appeared to most closely reflect the conceptual neighbourhoods of the majority of participants (Figure 7). However, in Hamilton this definition was much larger than what participants considered to be their neighbourhood boundaries as most conceptual neighbourhoods crossed three boundaries while the largest neighbourhood crossed six boundaries. (Figure 6).

What seemed to be the best fit in Hamilton was the census tract boundary (Figure 8). Eight conceptual neighbourhoods fell within one CT, and 11 fell within three CTs. Participants' boundaries often coincided with a CT boundary, likely because the CTs follow major roads in the city. In Mississauga, there appeared to be no relationship between participants' conceptual neighbourhoods and CTs. Only three conceptual neighbourhoods fell within one CT, while seven crossed five or more CTs (Figure 9). In conclusion, it seems that census tracts were more closely reflective of participants' conceptual neighbourhoods in urban Hamilton and that place name was most reflective of Mississauga's suburban participants.

Neighbourhood Amenities and Engagement

Maps were analyzed for the type and frequency of amenities drawn as well as distance to amenities from home. In Hamilton, the furthest distance any participant traveled to an amenity was 2,600 metres (average was less than 500 metres) while in Mississauga this distance was 21,000 metres (average was greater than 1,000 metres). Again, the necessity for participants in the suburban Mississauga neighbourhood to travel further for amenities was evident.

Table 3- Conceptual Neighbourhood Content

	Participant mentions				Frequency of mention		
	Hamilton	Mississauga	Total	%	Hamilton	Mississauga	Total
General							**111**
Home	15	16	31	100.0	15	16	31
Home previous*	2	1	3	9.7	3	1	4
School-current	10	14	24	77.4	10	14	24
School-previous/other	4	8	12	38.7	4	16	20
Landmarks-Natural (creek, lake)	1	6	7	22.6	1	10	11
Landmarks-Building (buildings/houses)	4	8	12	38.7	6	15	21
Network							**41**
Family	4	3	7	22.6	7	3	10
Work	1	3	4	12.9	1	3	4
Friends	10	3	13	41.9	22	5	27
Transport							**38**
Bus stop	2	2	4	12.9	3	3	6
Traffic lights	0	1	1	3.2	0	3	3
Parking	1	5	6	19.4	1	5	6
Street names >3	10	5	15	48.4	10	5	15
Alley	1	0	1	3.2	7	0	7
Train tracks	0	1	1	3.2	0	1	1
Food							**19**
Fast Food	3	5	8	25.8	3	9	12
Grocery	2	2	4	12.9	2	2	4
Convenience Store	3	0	3	9.7	3	0	3
Restaurant	0	0	0	0.0	0	0	0
Amenities							**95**
Library	2	6	8	25.8	2	6	8
Religious centres	2	4	6	19.4	2	5	7
Stadium/Arena	2	1	2	9.7	2	2	4
Recreation/community centres	7	7	14	45.2	7	7	14
Green parks	6	5	11	35.5	12	7	19
Playgrounds	1	4	5	16.1	1	4	5
Outdoor sports (pools, fields)	0	4	4	12.9	0	7	7
Mall	4	9	13	41.9	6	11	17
Plaza	1	6	6	22.6	1	6	7
Store	2	3	5	16.1	3	4	7
Other (medical clinic, bank)	2	1	1	9.7	1	1	**2**

* shelter

Despite differences between size of neighbourhoods and distance to amenities, the types of amenities that participants included in their maps were similar. The most *commonly* cited amenities included schools (24 of 31 participants), malls and/or plazas (24), recreation/community centres & libraries (22) and home of someone in their social network (20) (Table 3). In comparison, three participants noted convenience stores, six acknowledged religious institutions, and over half included a built or natural landmark.

The most *frequently* cited amenities were homes of network members (39 mentions), followed by green spaces/parks/playgrounds (31) and malls/plaza/stores (31). In contrast, food related amenities (grocery stores, fast food outlets) were mentioned a total of only 19 times. These garnered more attention when discussed in the interview as participants indicated that school cafeterias, shopping mall food courts, and homes were all places where food was accessed (but not necessarily mentioned when discussing the map amenities).

Participants were also asked to indicate on their maps where they felt most comfortable and least comfortable in their neighbourhood. Comfortable places were those locales where participants said they felt they could be themselves, felt confident with their body, and generally felt at ease. Most often was 'home' (by 29 participants), followed by school, friend's house, and then recreation/community centres. Often it was the people who inhabited these places that resulted in positive feelings:

> I feel good going to [community centre] because a lot of my friends go. There is like a gym, swimming pool and all that, and some of them work there too. So after school I will go there, and hang out with them… Yeah, I feel good there, like relaxed. (Female, 15 years, Hamilton)

In contrast, uncomfortable neighbourhood spaces made participants feel scared or judged, and included school, public transportation (buses in particular), certain streets and alleys, some parks, and shopping malls. Often participants had heard about crimes occurring in certain places (i.e., parks and on a streets in an alley) so they avoided them altogether, while others modified their behaviour by not traveling to these settings when it was dark. School and shopping malls were most often described as places where participants felt judged by their peers or others. Public transportation was not a comfortable space because it was often crowded and involved unwanted body contact with other users (intentional and unintentional contact). The predominance of social interaction as guiding participant's engagement with neighbourhood space was continuously evident throughout the interviews.

Other factors that determined engagement with neighbourhood space were mentioned by only a handful of participants, and included time, especially for the older participants who said that with school, work and, in some cases, family responsibilities, they did not have enough time to use certain amenities in their neighbourhood. Proximity to their home was important to some because few had access to a car and others preferred to avoid using public transportation as described above. Other participants stated that they used certain spaces only because there was nowhere else to go in their neighbourhood.

Another determinant important to a handful of participants was the rules surrounding the use of particular spaces. Four participants said that their parents and/or teachers determined when they could go out and where they could go. For instance,

teachers at an elementary school had strict rules about students leaving school property during lunch, while parents restricted participants from going out after certain hours (in all cases the participants were females), using public transportation to access amenities, and in the case of one younger male participant, crossing a busy major road. Other participants stated that they made their own rules about where they should go and when, which was generally governed by their feelings of safety.

Discussion

The results of this study highlight a number of important factors influencing adolescents' definition and use of neighbourhood space. In terms of defining neighbourhood, there was a range in the perceived size of neighbourhood even among participants within the same community. Past studies outside of geography, also found discrepancies in how residents define the same neighbourhood space (Coulton et al, 2001; Haney & Knowles, 1978; Logan and Collver, 1983). In fact, almost three decades ago, sociologists Guest and Lee (1984) concluded that "the search for high levels of agreement on the meaning of neighbourhood may be fruitless" (pg. 33). While complete consensus among residents (and researchers) about what constitutes a 'neighbourhood' may not be possible, our findings suggest that place-specific and population-specific definitions are important for considering neighbourhoods boundaries that have meaning to residents.

Boundaries were dependent on the suburban and urban status of the neighbourhoods. Those from urban Hamilton perceived their neighborhood to be smaller

in size than participants from suburban Mississauga. This is largely due to the sprawling nature of the suburbs in comparison to the condensed urban centre. For instance, school catchments areas in urban centres are smaller to accommodate the increased number of students residing in high-density housing. Given that the Mississauga neighbourhood is more self-contained than most in the city, it is anticipated that the perceived size of other suburban neighbourhoods would be even larger. This finding does support past work in sociology from the 1980s which demonstrated that there are urban and suburban differences in how neighbourhoods are defined (Guest & Lee, 1984). Our findings suggest this trend still exits and needs to be acknowledged in current research that often relies on one definition regardless of the urban status of the neighbourhoods being investigated.

The need for a place-specific approach is also apparent when overlaying conceptual neighbourhoods with other commonly used boundaries. There was obvious variance in how the administrative boundaries were drawn, particularly census tracts, which are dependent on the population density (e.g. each CT has approx 4,000 residents), and reflect the street patterns of the city. In urban Hamilton, the city streets follow a grid pattern while Mississauga has a typical suburban pattern with jagged streets & cul-de-sacs. Given these differences, it makes intuitive sense that participants in Hamilton often drew their conceptual neighbourhoods as more closely related to census tracts because they coincide with major streets that residents identify with. In Mississauga, census tract boundaries appeared to be too arbitrarily drawn to have meaning for residents. Rather, place name resonated more with participants likely a result of self-contained and isolated

(from the city centre) nature of the Mississauga neighbourhood, and because pplace name is often used by the local government, media, community organizations and city residents when referring to the neighbourhood. Past research has found that residents identify with place name regardless of negative connotations and potential stigmatization of belonging to that neighbourhood (Flowerdew et al, 2008). While this was likely the case given the high-risk, low-SES status of the neighbourhood, the high number of immigrants who live in the area may further magnify this sense of belonging. This population often maintains the status of 'outsider' having recently arrived in the country, and often seek to attach to something inherently Canadian such as membership to a well-defined neighbourhood community (Pearce, 2008). The reliance on place name for residents is certainly not a new finding having been acknowledged by past researchers decades ago (Guest, Lee & Staeheli, 1982), yet researchers then argued that identification with place name was on the decline, and the findings of more recent work (Brower, 1996) and this study suggest otherwise. Overall, the preferred definition of neighbourhood in this study and others (Flowerdew et al., 2008; O'Campo et al., 2007) is one that has relevance and meaning to residents.

We also recommend a population-specific approach when conducting research on neighbourhood context. Neighbourhood definitions were largely dependent on knowledge of the local environment, which we found to be impacted by participants' age, level of mobility and migration status, which influence how long residents have been exposed to their local environment. Future research using neighbourhoods as a scale of analysis because of its homogenous population will need to account for differences

among residents especially given the increasingly diverse population in many developed countries. This may require researchers to consider the demographics of the specific neighbourhoods that they choose to study in order to assess which definition is most suitable to use.

While previous reliance on administrative boundaries to define neighbourhoods implies that neighbourhoods are physical entities, this study suggests that at least to adolescents, neighbourhoods are predominantly sites for social interaction. Thus, in contrast to the suggestion of Guest & Lee (1984), neighbourhoods as social entities are not obsolete. In fact, the power of social connection and interaction to move youth across neighbourhood space and enlarge or shrink their geographies was clearly evident in this study. It also echoes past research on the importance of neighbourhoods as sites promoting social cohesion and social capital (Catrell, 2001; Forest & Kearns, 2001; Veenstra et al., 2005) for adult residents. Further research is still needed to examine whether current understandings and measures of neighbourhood social capital are relevant to the adolescent population. Certainly, using resident-defined neighbourhoods would be a suitable scale in which to conduct such research.

This study collected perceptual data from participants, which relied on recall capacity of the adolescents in both the map exercise and the interviews. This data can be ground-truthed by accompanying youth as they engage with their neighbourhood utilizing go-along interviews (Carpiano, 2009; Jones et al., 2008) or through tracking youth as they engage in their neighbourhood through the use of GPS (Benedict et al., 2010; Rainham et al., 2010).

Further, this study recruited participants living in low-SES communities, many of

whom would be considered members of low-income families themselves. However, family income data was not collected in this study so there is no way of knowing which participants were actually low-SES themselves. Adolescents with higher-SES are likely more mobile due to increased access to private transportation to travel outside of their neighbourhood and/or engage in recreational activities that may take them outside their neighbourhood (e.g. sports team). Future studies on the perceived neighbourhoods of youth with higher SES is necessary in order to determine whether greater access to financial resources translates to larger perceived neighbourhood size. The findings from this study suggest that it will.

While this study lends important insight into some of the similarities between and within low-SES neighbourhoods, the sample size of this study was small (n=2) and the number of interviews was too small (n=31) to attempt to make generalizations about the adolescent population. However, the qualitative nature of this study allows for new insights into how and why youth use their neighbourhood space and how they define neighbourhood.

Additionally, the recruitment strategies used in this study resulted in a number of participants who were users of local community centres and were knowledgeable about certain local amenities as well as tapped into various social networks. It is possible that less involved participants would have less knowledge about the neighbourhood and its amenities. Finally, data was collected only once from participants at one particular time of year. Multiple measures (ideally during different seasons) will help confirm these findings.

In terms of furthering our understanding of suitable neighbourhood boundaries for adolescent health research, the findings suggest that one-size does not fit all. Instead it advocates for a place-specific and population-specific definition of neighbourhood. In addition, rather than simply uncovering the black box effects of context alone, future research- certainly with adolescent populations- needs to examine how places and people interact in order to better understand the relationship between neighbourhoods and human behaviour.

References

Amsden, J. &VanWynsberghe, R. (2005). Community mapping as a research tool with youth. *Action Research,* 3, 357-381.

Asanin Dean, J. & K. Wilson. (2009). "Education? It is irrelevant to my job now and it makes me very depressed…": Exploring the health impacts of under/unemployment among highly-skilled recent immigrants in Canada. Ethnicity & Health, 14(2); 185-204.

Basta, L.A., Richmond, T.S. &Wiebe, D.J. (2010). Neighbourhoods, daily activities, and measuring health risks experienced in urban environments. *Social Science & Medicine,* 71, 1943-1950.

Bauder, H. and Sharpe, B. (2002). Visible Minorities in Canada's Gateway Cities. *The Canadian Geographer,* 46(3); 204-222.

Brower, S. (1996). Good neighbourhoods: A study of in-town and suburban residential environments. Westport, CT: Praeger

Bullen, N., Moon, G. & Jones, K. (1996). Defining localities for health planning: A GIS approach. *Social Science & Medicine,* 42(6); 801-816.

Carpiano, R. (2009). Come take a walk with me: The "go-along" interview as a novel method for studying the implications of place for health and well-being. *Health & Place,* 15(1); 263-272.

Cattrell, V. (2001). Poor people, poor places, poor health: the mediating role of social networks and social capital. *Social Science & Medicine,* 52(10), 1501-1516.

Coulton, C., Korbin, J., Chan, T. & Su. M. (2001). Mapping Residents' Perceptions of Neighborhood Boundaries: A Methodological Note. *American Journal of Community Psychology*, 29(2); 371-383.

Dietz, R. (2002). The estimation of neighborhood effects in the social sciences: An interdisciplinary approach. *Social Science Research*, 31(4); 539-575.

Diez Roux, A.V. (2001). Investigating neighborhood and area effects on health. *American Journal of Public Health,* 91(11);1783-9.

Flowerdew, R., Manley, D. & Sabel, C. (2008). Neighbourhood effects on health: does it matter where you draw the boundaries? *Social Science & Medicine,* 66(6);1241-55.

Forrest, R. & Kearns, A. (2001). Social Cohesion, Social Capital and the Neighbourhood. *Urban Studies,* 38(12), 2125-2143.

Guest, A. M., & Lee, B. A. (1984). How urbanites define their neighborhoods. *Population and Environment*, 7, 32–56.

Haney, W. G., & Knowles, E. S. (1978). Perception of neighborhoods by city and suburban residents. *Human Ecology,* 6, 201–214.

Harrington, D. & Elliott, S.J. (2009). Weighing the importance of neighbourhood: a multilevel exploration of the determinants of overweight and obesity. *Social Science & Medicine*, 68; 593-600.

Hiebert, D. (2002).Cosmopolitanism at the Local Level: The Development of Transnational Neighbourhood. Oxford, UK: Oxford U Press.

Johnston R.J, Forrest J, and Poulsen M.F. (2002) Are there Ethnic Enclaves/Ghettos in English Cities? Urban Studies, 39, 591-618.

Jones, P., Bunce, G., Evans, J., Gibbs, H., & Ricketts Hein, J. (2008). Exploring space and place with walking interviews. *Journal of Research Practice*, 4(2); 1-9.

Jones, A., Van Sluijs, E., Ness, A., Haynes, E. & Riddoch, C. (2010). Physical activity in children: Does how we define neighbourhood matter? *Health and Place*, 16(2); 236-241

Kaczynski, A.T., Potwarka, L.R., Smale, B.J.A. & Havitz, M.F. (2009). Association of Parkland proximity with neighborhood and park-based physical activity: Variations by gender and age. *Leisure Sciences,* 31, 174–191.

Kawachi, I. and L.F. Berkman (2003). Neighbourhoods and Health. New York: Oxford University Press Inc.

Logan, J. & Collver O. (1983). Resident perceptions of suburban community differences. *American sociological review*, 48(3); 428-433.

Luginaah, I., Jerrett, M., Elliott, S., et al. (2001). Health profiles of Hamilton: spatial characterization of neighbourhoods for health investigations. *Geo Journal*, 53,135–47.

Macintyre, S., Ellaway, A. & Cummins, S. (2002). Place effects on health: how can we conceptualise, operationalise and measure them? *Social Science & Medicine,* 55, 125-139.

McNamee, S. (1998). ‘ The home: youth, gender & video games: power and control in the home’, in T. Skeleyon and G. Valentine (eds) Cool Places: Geographies of Youth Cultures, London: Routledge. Pp. 197-206.

Matthews, H., Limb, M. & Taylor, M. (2000). The street as thridspace in Holloway S. L. & Valentine G. (Eds.). (2000). Children's Geographies: Playing, Living, and Learning. New York: Routledge. Pp. 54-68.

O'Campo, P., Salmon, C. & Burke, J. (2009) Neighbourhoods and metal well-being: what are the pathways? Health & Place 15, 56-68.

Openshaw, S. (1984). The Modifiable Areal Unit Problem. Norwich, UK: Geo Books.

Patton, M. (2002). Qualitative research and evaluation methods (3rd ed.). Thousand Oaks, CA: Sage.

Pickett, K.E. & Pearl, M. (2001). Multilevel analyses of neighbourhood socioeconomic context and health outcomes: a critical review. *Journal of epidemiology and community health,* 55(2); 111-122

Popay, J, Williams G, Thomas C & Gatrell, T. (1998) Theorising Inequalities in Health: The place of lay knowledge. *Sociology of Health and Illness*, 20, 619-644.

Pouliou, T., Elliott, S.J., Páez, A. & Newbold, K.B. (2011). Building obesity in Canada: understanding the individual- and neighbourhood-level determinants using a multi-level approach. *Social Science & Medicine*, In press.

Ross N, Tremblay S, Graham K. (2004). Neighbourhood influences on health in Montreal, Canada. *Social Science & Medicine*, 59, 1485-1494.

Rainham, D., McDowell, I., Krewski, D. & Sawada, M. (2010). Conceptualizing the healthscape: Contributions of time geography, location technologies and spatial ecology to place and health research. *Social Science & Medicine*, 70, 668-676.

Saarloos, D., Kim, J.E. & Timmermans, H. (2009). The built environment and health: Introducing individual space-time behaviour. *International Journal of Environ- mental Research and Public Health*, 6, 1724–1743.

Santo, C., Ferguson, N. & Trippel, A. (2010). Engaging Urban Youth through Technology: The Youth Neighborhood Mapping Initiative. *Journal of Planning Education and Research,* 30(1); 52-65.

Schaefer-McDaniel, N., Dunn, JR, Minian, N & D Katz. (2010). Rethinking measurement of neighbourhood in the context of health research. *Social Science & Medicine,* 71, 651-656

Sellström, E. & Bremberg, S. (2006). Is there a "school effect" on pupil outcomes? A review of multilevel studies. *Journal of epi and com health,* 60(2):149-55.

Strauss, A.I. & Corbin, J. (1998). Basics of qualitative research: techniques and procedures for developing grounded theory. 2nd ed. London: Sage.

Veenstra G., Luginaah I., Wakefield S., Birch S., Eyles J. & Elliott S. (2005). Who you know, where you live: social capital, neighbourhood and health. *Social Science & Medicine*, 60(12), 2799-2818.

Wheelera, B., Cooperb, A., Pageb, A. & Jagob, R. (2010). Greenspace and children's physical activity: A GPS/GIS analysis of the PEACH project. *Preventive Medicine*, 51(2); 148-152.

Walks, R. A. and L. S. Bourne. (2006). Ghettos in Canada's Cities? Racial Segregation, Ethnic Enclaves and Poverty Concentration in Canadian Urban Areas. *Canadian Geographer,* 50(3): 273-297.

CHAPTER FOUR

Adolescent perceptions of determinants of body weight

Authors: Jennifer Asanin Dean, PhD Candidate[1], Susan J. Elliott, PhD[2], Kim Raine[3]

[1]School of Geography & Earth Sciences, McMaster University
Hamilton, ON, Canada

[2]School of Public Health & Health Systems, University of Waterloo
Waterloo, ON, Canada

[3]Centre for Health Promotion Studies, University of Alberta
Edmonton, Alberta

Manuscript to be submitted to: Preventive Medicine

Correspondence and reprint requests:

Jennifer Asanin Dean
School of Geography and Earth Sciences, McMaster University
1280 Main St. W., Hamilton, ON, L8S 4K1
Tel: 905-525-9140 ext. 20440 Email: asaninjl@mcmaster.ca

Abstract

In the context of 'globesity', excess body weight is now widely acknowledged as a major public health concern by researchers, policy makers and the general population. To date, the majority research has focused on individual-level factors under the assumption that modifying individual behaviour- rather than challenging structural and environmental causes- will most effectively reduce the high prevalence of obesity. These assumptions reflect a 'blame the victim' discourse that stigmatizes obese individuals as lacking the control and willpower needed to have a body that is socially acceptable. There is a lack of knowledge about how adolescent populations socially construct body weight and understand issues surrounding its etiology. Accordingly, the aim of this research is to describe perceptions of the determinants of body weight. In-depth interviews with 31 adolescents living in low-socioeconomic status neighbourhoods in Ontario, Canada were conducted. Perceptions of obese bodies as unhealthy as well as the predominance of individual-level factors as determinants of body weight are discussed. Environmental determinants and neighbourhood factors perceived to influence body weight are also highlighted. The importance of deconstructing current perceptions of healthy bodies and prioritizing both individual agency and structural influences in the current 'epidemic' is discussed.

Introduction

Excess body weight is widely acknowledged as a major public health concern by researchers (Tjepkema, 2005; Shields, 2004; Vanasse et al., 2006), policy makers (Leitch, 2008; PHAC, 2009) and the general population (Harrington et al., 2011; Krewski et al., 2006), which is not surprising in a social climate that views obesity as a 'global epidemic' (WHO, 2000). Of note, the prevalence of overweight and obesity has risen rapidly in many developed countries, particularly in certain sub-populations. For example, in Canada between 1981 and 1996 rates of childhood overweight and obesity more than tripled in boys (from 13% to 43%) and more than doubled in girls (from 15% to 36%) (Tremblay et al., 2002). Accordingly, obesity was declared one of three major health concerns by Health Canada:

> Many life-long diseases begin in childhood. Given the prevalence of childhood obesity, and given its contribution to many diseases, this is the first generation that may not live as long as their parents. Obesity is now having a huge life expectancy impact, which was not foreseen ten years ago. (Leitch, 2008, pg. 12)

A recent body of research has acknowledged the importance of 'obesogenic environments', those places that promote an unhealthy lifestyle through inadequate food availability and increased sedentary activity (Davison & Birch, 2001; Egger & Swinburn, 1997; Swinburn, Egger & Raza., 1999). In order to assess the role of this environment in shaping body weight, Swinburn, Egger & Raza (1999) developed the Analysis Grid for Environment Linked to Obesity (ANGELO) Framework which includes two environmental scales (micro-settings and macro-sectors) and four environmental types (physical, economic, socio-cultural and political). In essence, the framework suggests that

while individual genes and behaviours are important determinants of body weight, so too are those environments in which these genes and behaviours are expressed (Figure 1).

SIZE / TYPE	Micro-environment (settings)		Macro-environment (sectors)	
	Diet Activity	*Physical*	*Diet Activity*	*Physical*
Physical	*What is available?*			
Economic	*What are the financial factors?*			
Political	*What are the rules?*			
Socio-cultural	*What are the attitudes, beliefs, perceptions and values?*			

Figure 1- ANGELO Framework (Swinburn, Egger & Raza, 1999)

To date, the majority of obesity research has focused individual-level factors (e.g., physical activity levels, diet, sedentary behavior) under the assumption that modifying individual behaviour- rather than challenging structural and environmental causes- will most effectively reduce the high prevalence of obesity. Often accompanying these assumptions is a 'blame the victim' discourse that stigmatizes obese individuals as lacking the control and willpower needed to have a body that is socially acceptable (Braziel & LeBesco, 2001; Campos et al., 2006; Gard & Wright, 2005; LeBesco, 2004). A significant body of literature explores the negative impacts of such stigma on overweight and obese populations (Janssen et al., 2004; Neumark-Sztainer et al., 1999; Puhl & Latner, 2007), while further studies argue that changing the social construction of body weight is an important step to lessoning some of the health impacts experienced by obese individuals (Colls & Evans, 2010; Longhurst, 2005).

However, there is a lack of knowledge about how adolescent populations socially construct body weight and understand issues surrounding its etiology. That vast majority of research related to adolescent perceptions focus on ideal body weight/type and personal body image (Fonesca & Gaspar de Matos, 2005; Hill & Silver, 1995; Pritchard et al., 1997; Thompson et al., 1996). Moreover, there lacks an understanding of whether the increasing connection between environmental factors and body weight is significant to general populations. This knowledge is important for deciding on future public health interventions that will have the most impact on shifting the attitudes and behaviours of those at-risk populations, as well as modifying local environments to be more health promoting. In this context, this research seeks to describe adolescent perceptions of the determinants of body weight.

Study Design and Methods

This study is part of a larger research program examining the environmental determinants of body weight among adolescents living in low- socioeconomic status neighbourhoods in Ontario, Canada. In the current study, in-depth, semi-structured interviews were conducted with 31 participants. Potential participants were recruited through a number of strategies including advertisement mail sent to all households in the target neighbourhoods as well as flyers posted within the community (at libraries, recreation centres, grocery stores, lamp posts and bus shelters). Additional recruitment was completed at local community centres using information booths and brief presentations to youth groups. Snowball sampling was also used.

Interviews were conducted at participants' homes (n=10) as well as in public settings (i.e., study rooms at the library, conference rooms at recreation centres) (n=21). Participants were asked to complete a short socio-demographic survey, and had their height, weight and waist circumference measured. Participants were asked questions about how they would describe healthy bodies, what determines body weight, what constitutes a healthy lifestyle, where they obtain health information, as well as specific aspects of their local environment as it related to body weight. Interviews lasted between 75 and 140 minutes, were audio recorded and transcribed verbatim.

In addition, a small group of participants (n=6) took part in go-along interviews where the researcher accompanied the participant on a walk around their neighbourhood (Carpiano, 2009). This component of the interview served as an important exercise in ground-truthing (Sharkey & Horel, 2008) as it allowed the researcher to verify some of perceptual data regarding available neighbourhood resources.

The majority of participants were females between the ages of 13-19, and 11 were born outside of the country (Table 1). Participants' BMI were calculated based on height and weight measures and reported using age and gender specific percentiles. BMI scores ranged between the 8^{th} and 99^{th} percentile with 5 participants between 85^{th}- 95th percentile (often described as overweight), and 6 above $95th^{th}$ percentile (considered obese). Waist circumference measures also ranged from 24-52 inches with 17 participants having measures that suggested their health was at risk.

Table 1- Socio-demographic profile of participants

	Total (n=31)	% of population
Gender		
Female	24	77.4
Male	7	22.6
Age		
13	7	22.6
14	3	9.7
15	6	19.4
16	7	22.6
17	8	25.8
Country of Birth		
Canada	20	64.5
China	1	3.2
Pakistan	2	6.5
India	8	25.8
Body Mass Index Percentiles		
<15th	3	9.7
15th-84th	17	54.8
85th-95th	5	16.1
>95th	6	19.4

Results

Healthy Bodies

Participants were first asked to describe a healthy body. Most used body size as a measure of health stating that a healthy body was moderate in size: "not too skinny, not too fat" (13 years old, Female, 64th percentile for BMI). Participants also discussed good hygiene practices (i.e., brushing teeth, wearing deodorant, combing hair) as being important for health. However, most of the discussion around a healthy body focused in

its ability-level; healthy bodies were energetic, powerful and capable (thus, always described as able-bodied):

> I think stamina can tell you if you are healthy or not. If your breath gets heavy so frequently, if you run, do some heavy work, you pick up something, then you get tired and then you are not healthy. (17, Male, 71st percentile for BMI)

The majority of participants (n=19) felt they had a healthy body while 6 felt their body was unhealthy based on a diagnosed illness, and/or current experience of pain. Another 6 participants were unsure whether they had a healthy body based on inconsistency between how they felt and what other people told them about their body. For instance, one participant had chronic back pain but doctors could not find a cause. Consequently she was unsure if her body was healthy. Another participant was told at a recent physical appointment that she was in good health but did not think she was a healthy size.

Although the majority of participants felt their bodies were healthy, 27 said that they would make changes to their body if they had the opportunity. The most desired changes were to be taller, slimmer or more muscular (only cited by male participants), having a 'flatter stomach', or different facial features (e.g., smaller nose, more defined cheek bones).

In contrast to healthy bodies which were always described as energetic and alive, unhealthy bodies were those that were 'too skinny' or 'too fat' and were almost always described in the context of sickness or death. Obese bodies were always described as in the process of dying:

> There might be a point in my life where I get too big and that is not good… It leads to obesity and you eventually die from it, and I don't want to die. (16, Female, 92nd percentile for BMI)

This worry that being 'big' leads to obesity and eventually death was shared by a number of participants with many different BMI scores. When asked to elaborate, most participants told stories of friends or 'a friend of a friend' who had negative health implications due to large body size. For example, participants shared stories of people having heart attacks and developing diabetes. One particular story stands out where a participant described a family friend who had undergone surgery 'to become skinnier' and ended up dying from a blood clot as a result of the procedure.

When discussing underweight bodies, participants often used 'skinny', 'thin' and 'anorexic' interchangeably. Certainly for one participant who shared that she had been hospitalized for an eating disorder, her association of thinness with 'not healthy' was based upon needing to be hospitalized. Other participants described 'skinny' bodies as 'anorexic' consistently, a practice that suggests thin bodies only exist within the context of severe illness. The only way a body was too thin was when it resulted from an eating disorder, otherwise thinness was accepted as healthy.

Determinants of Body Weight

When asked to describe the determinants of body size, over ninety-five percent of the comments discussed individual-level factors (versus environmental), with the majority focused on diet and eating habits. In the discussion of individual-level factors, only a handful of participants indicated that genetic and biological factors were important

predictors of body weight. Often the equation for healthy body weight was very simple: eat better and/or exercise more. When asked about determinants of body size, one participant simply stated 'food'. When asked to elaborate, he said, "skinny people eat healthy food, big people eat junk food, anorexics don't eat at all." (13, Male, 40th percentile for BMI). There was little consistency among participants with similar BMI scores as to the determinants of body weight.

Divergent perspectives of self-control were especially apparent among participants with higher BMI scores. For example, a participant shares her belief that body weight is largely based on genetics and thus she has little control over making significant change to it:

> Yes, I think I am healthy but I am not like other girls. I actually do exercise. As much as I try and lose weight, I lose weight. But then I always gain it back, that's just what I am like. It doesn't matter how much I exercise, I just gain it back… (13, Female, 97th percentile for BMI)

In contrast, another participant shares her perception that body weight is ultimately within her control:

> [Fat comments] are not always directed to me, but I need to realize that I am. The thing is that I could change it because it could go away and then come back. It is something that could be changed. It is not permanently on me. (15, Female, 99th percentile for BMI)

The above quote highlights the dominant perspective that controlling body weight comes down to the personal characteristics of the individual. For instance, the participant said that if she could just run up and down the stairs a few more times per day, or take her dog for a walk more often, or say 'no' to junk food that she could lose weight. She believed that working harder would result in weight loss. This sentiment was echoed by two other

participants who showed the interviewer pictures of themselves when they were heavier in weight. In both cases participants exuded pride over their ability to lose weight, and how they now looked.

One major difference between the participants with lower BMI scores and those with higher scores, was a focus on the permanence of body weight. As the two quotes indicate above, body weight was considered a fluid characteristic, as there was a sense that what weight was lost could/would return. This was not a concern shared by a majority of the participants with lower BMI scores.

When participants were asked about where they gained most of their health knowledge from, all but one said 'school'. Other major sources of information included family (e.g., parents and siblings) (n=17), the media (e.g., television, internet, magazines) (n=15) and friends (n=8). One participant stated that he was not sure where he learned health information from. Many participants were eager to share that while they were exposed to health information through television watching and magazine reading, especially about ideal body size, that these sources were not as reliable to them as school or family members. Most participants stated that the internet was also more reliable than television but friends as a reliable source of information received mixed feelings.

Environmental determinants

Participants were asked to discuss the role of environmental factors in shaping body weight and most of the discussion revolved around aspects of the local environment that influenced their ability to eat healthy food and/or engage in physical activity.

The physical environment was the most widely discussed by participants who often stated that there was a lack of healthy food options in their neighbourhood. More specifically, participants said that there was an abundance of fast food options while the (few) healthy food stores that did exist often stocked unhealthy options. One participant states:

> There is a grocery store and right when you walk in, like you see the chips, chocolate and other junky stuff. Then there is just [donut/coffee shop] and [convenience store] here…" (14, Male, 40th percentile for BMI)

Other participants felt that healthy options did exist within their community but these were outnumbered by unhealthy options.

Many felt that the local weather was a hindrance for engaging in physical activities. This was especially true given that the interviews took place in the fall and winter months. Weather was more often cited, but not exclusively, by participants who were newcomers to the country. A handful of passionate participants also shared the perception that there was a lack of culturally appropriate options within in their community. Some wanted more cricket pitches while one stated that she had to go outside the city to find an ethnic grocery store. However, this was not shared by all participants as many felt that the neighbourhood was well equipped with ethnic food stores.

The majority of participants also discussed the existence of economic barriers, which was not surprising given the low-income status of the neighbourhoods. For example, certain physical activities were seen as too costly for participants and their families:

> I want to play soccer or go back to dance. Problem there: It is like $90 a month for all three of us to do it, and if one goes, it is not fair to the others. (14, Female, 98th percentile for BMI)

Economic barriers were generally discussed in the context of certain activities rather than all. For example, while equipment for hockey can be costly, participants considered other sports such as basketball more economical. Affordability of certain activities was also dependent on family situation as stated by the participant above.

The cost associated with food was seen as a barrier to taking up a healthy diet. Almost all the participants in high school stated that food in the cafeteria was far too costly, especially given its poor nutritional quality. Participants discussed their preference for going to eat the same food at restaurants in their neighbourhood for much less money.

Not all participants shared the perceptions that their neighbourhood had physical and/or economic barriers to healthy living:

> We have the community centre, and a gym, and then parks, and then fields. Yea, it is good here. Like if you want to run and get a healthy body, you can. It is not hard. We are just lazy. (17, Male, 70th percentile for BMI)

When further examining the neighbourhoods in terms of their physical and economic environments, it was evident during the go-along interviews that many affordable opportunities did exist for teens. For instance, neighbourhoods had large discount grocery stores, one community had an abundance of ethnic grocery stores, and there were community centres with free programming geared towards teens in both neighbourhoods. In one community there were also parks that had been retrofitted to look like outdoor fitness centres, complete with outdoor versions of various fitness machines. Yet,

participants continued to report a lack of access to these opportunities for reasons largely due to the neighbourhoods' social and political environments.

The most widely discussed aspect of the social environment revolved around feelings of safety. Participants often discussed their avoidance of certain neighbourhood spaces where they felt uncomfortable/unsafe. This resulted in limited access to certain streets and/or areas in their neighbourhood as one participant explains:

> I did have some problems with the people next door, they were drug addicts, so it wasn't really a safe place to go outside when they were around. I barely go on [A Street] anymore because there's drug addicts on that street too, and I barely go down [B Street] because there's a drug house on the corner, and one of the people over there had a problem with [my sister] when she was walking by, so I barely walk down [C Street] either…" (13, Female, 97th percentile for BMI)

Many participants described similar self-imposed restrictions on using neighbourhood space. Three participants would not use a park because of a violent stabbing that happened there months prior.

Peer influences were also perceived as influencing health behaviours. Often participants wanted to go to the same restaurants as their friends, even if they knew it was an unhealthy option. One participant describes his dilemma when choosing to eat lunch with friends:

> If you are going to [fast food outlet] and the whole group is eating, you are not going to just stare at them. So you go and have something that you can eat like fries rather than the [non-Halal] meat." So that is bad influence, your friends… (17, Male, 21st percentile for BMI)

As the above quote alludes to, culture was important especially for ethnically diverse participants. Local resources are often geared towards the dominant ethnic groups in the community resulting in other ethnic groups needing to travel well outside their

neighbourhood to access culturally specific resources such as religious buildings, and or ethnic food stores as stated earlier.

In addition, peer group membership determined what was socially acceptable to bring for lunch. Some participants stated that they would be made fun of if they brought a salad to school, while others stated that bringing healthy snacks was accepted within their peer group. Also, there were gender-specific norms about teenage girls participating in sports, most stated that they no longer played. For those who did play, they said it was a challenge to get field time or equipment because it was often reserved for the (competitive) boys' teams.

Another commonly cited social environmental factor was related to time. As teenagers, the participants felt that they were too busy with school, exams, work or other responsibilities to engage in certain lifestyle behaviours such as exercise.

Overall, there was very little discussion about the importance of the political environment. However, analysis of the transcripts revealed that informal policies set by parents and teachers had some influence on lifestyle behaviours. A handful of participants said that parents and teachers set guidelines where they went, specifically in relation to going out at night or leaving school property during lunch breaks.

Neighbourhood Space

Most participants stated that their neighbourhoods were healthy places to live (a handful disagreed stating that the violence, and drug use resulted in an unsafe and therefore unhealthy neighbourhood). However, when analyzing the interviews, it appeared that participants quite often described their neighbourhood as a challenging

setting to maintain a healthy lifestyle. The prevalence of unhealthy foods made healthy choices for adolescents difficult as one participant explains:

> When you pass through [the mall], usually you see in the food courts, like lots of fried food. So sometimes you are tempted, but usually you don't want to because you think like, "Oh god, if I eat that, I am going to feel horrible after". So usually you just stop yourself, and you walk by. (15, Female, 67th percentile for BMI)

As this participant described her neighbourhood as a tempting place, she placed her hands at the side of her face as if putting up blinders so that she would not see all the unhealthy options in the neighbourhood environment. This need to self regulate in public space was shared by others and was often contrasted by the safety of home space:

> At school right, there is like a lot of junk food around you, and it tastes good. You go and eat it, whenever you have money... And then after you are like, "I shouldn't have had it, I could have just gone home, and ate something healthy." (17, Female, 97th percentile for BMI)

The vast majority of participants shared this perception that home was a safe space. The most common reason for this was due to the presence of parents who either shopped for or prepared healthy food. This made it easy for participants to make a healthy choice with respect to food when their options were limited to mostly healthy food. While some participants shopped for food for their family, they often went with a parent who decided on the items for purchase or went with a list prepared by parents.

However, not all participants had parents who were available to prepare food. This was true for 5 participants in one community whose parents either did not live with them or were at home but unable to fulfill the typical parental duties experienced by other participants (due to drug addiction, incarceration, or hospitalization) and for 6 participants (all recent immigrants) whose parents either did not yet live in the country or

who engaged in precarious employment (often shift work) to bring in income. These conditions were exacerbated by the lone- parent (mostly mothers) or lone-guardian families (in five cases a grandmother and in two others an aunt or uncle), which had implications for participants' access to resources both within the home and the neighbourhood.

Discussion and Conclusions

One of those most salient findings of this study is how adolescents perceive healthy bodies and unhealthy body weight. The majority held dangerous views on body weight, specifically the deadly nature of overweight and obese bodies. In addition, thin bodies were overwhelmingly classified as anorexic, which is equaling concerning particularly among a population with high rates of eating disorders (Hoek, 2007). Moreover, the belief that healthy bodies are always capable and able, implies the problematic perspective that disabled bodies are inherently unhealthy. This likely explains the confusion shared by some participants in terms of whether they had a healthy body, especially when they believed the capability and look of their body were not inline with common conceptions of what is healthy.

These extreme perceptions reflect the social construction of obesity as an unhealthy epidemic needing to be managed, and is prevalent in current public health discourse that often links deviant bodies with poor physical health (see Asanin Dean & Elliott 2011 for a more in-depth discussion). Thus, there is a need to reshape the perspectives of adolescents around healthy bodies, and to normalize bodies of every size

and ability as having the potential for healthiness. For instance, the Health at Every Size movement focuses on changing common misconceptions about overweight and obese bodies as sickly (Aphramor, 2005; Robinson, 2005). Further, the fact that participants receive much of their information from school and family indicates that these are important avenues for future health promotion.

In addition, this study has shed light onto the role of environmental determinants of obesity in general and neighbourhood influences on body weight in particular. With respect to environmental factors, there was a disconnect between participants' description of the local physical and economic environments and what actually existed in those environments as evident through ground-truthing during go-along interviews. While increasing awareness of available amenities is a relatively easy intervention to implement, often awareness alone does not increase access.

Even when participants were aware of outdoor play parks where they could partake in physical activity, these spaces were not used because of socio-cultural and political environmental factors. As multiple participants highlighted, concerns about safety prevented them from accessing resources. A connection between perceptions of safety and physical activity levels has been observed in other studies with parents (Carver et al., 2008; Lumeng, 2006; Timperio et al., 2005; Tucker et al., 2009) and adult populations (Burdette & Hill, 2008; Stafford et al., 2008). This study is one of the first to gather in-depth perceptual data from adolescents, in contrast to those that rely on gathering data from surveys (Cohen et al., 2008; Evenson et al., 2007; Mota et al., 2005; Romero, 2005). The benefit of this qualitative study, is that it was able to highlight

specific concerns related to safety (e.g., illegal drug use), the locations of concern (e.g., neighbourhoods house, park) and the impact of these perceptions (e.g., limiting exposure by not traveling down a certain street).

Additional socio-cultural factors were important for participants in this study. Specifically, peer group norms and gender-specific values determined participants' use of neighbourhood resources and amenities. Again, the importance of peer influence is not a new finding, but is more often linked to risky health behaviours such as smoking, alcohol consumption or sexual behaviour (Bauman & Ennett, 1996; Brown et al. 1986; Kirby, 2001) rather than lifestyle behaviours related to body weight. Likewise, the finding that gender differences exist in physical activity levels has been discussed elsewhere in the research (Vilhjalmsson & Kristjansdottir, 2003), but the suggestion that girls' sports receive less time and equipment than do boys needs further investigation.

The political environment was largely absent in the discussion of environmental factors shaping body weight both in this study and in the literature (Raine et al., 2008). Yet, decisions that influence the physical and economic environments are undoubtedly informed by formal and informal policies and rules that make up the political environment. Among some participants, interaction with the physical environment was determined by informal rules set by their parents and teachers. A more problematic scenario is that access to neighbourhood space is governed by anonymous individuals. For instance, some participants avoided using certain public spaces because of the violence that occurred there implying that those engaging in deviant behaviour control that space. Even when deviant behaviour is not taking place, the spaces were often

stigmatized (i.e., deemed unsafe) thus preventing future use. Such findings raise important moral questions about the structure of urban space and who /what determinants adolescents' use of that space?

Another significant finding involves the depiction of neighbourhood space as tempting, unsafe and unhealthy, particularly in reference to healthy eating, and in contrast with the safety and healthiness of home. Overall there is a lack of consensus about whether access to unhealthy food options is increased in low-ses neighbourhoods in Canada (Apparicio et al., 2004; Latham & Moffat, 2007; Smoyer-Tomic et al., 2006). Regardless, research does suggest that even *perceptions* of local environments have an important impact on health in general (Wilson et al., 2004) and body weight in particular (Boehmer et al., 2007; Tiemperio et al., 2005).

The findings of this study further point to the need for theoretically situating the adolescent obesity issue. Specifically, participants' focus on controlling their own bodies through diet and exercise perpetuates the belief that body weight is largely the outcome of poor individual decision making and a lack of will power. However, the fact that many participants felt the need to self-regulate outside the home, suggests that on some level they acknowledge that the neighbourhood environment is flawed. From a structural perspective, the role of poverty, drug addiction and gang violence in both of these neighbourhoods greatly influenced what existed in those spaces (physical and economic environments) *and* also how that space was used (socio-cultural and political environments). Moreover, those same forces make negotiating the neighbourhood even more difficult due to limited financial resources, lack of social stability in the home, and

migration and settlement processes, among others. The importance of structural forces that shape unhealthy environments *and* individual agency required to navigate those spaces, was apparent in this study, although participants only acknowledged the latter.

The lack of explicit acknowledgement of local environments however, is not surprising given the unbalanced attention of these factors by researchers and policy-makers. However, as Giddens' structuration theory suggests (1984), the relationship between structure and agency is mutually-reinforcing. Structure does not manifest out of thin air but is a product of the population in a particular spatial and temporal context. Thus, the uptake of this theory, or others that blur the structure and agency divide, is an important step to understanding the role of environmental factors that shape body weight in particular and health in general.

While this study does provide important contributions outlined above, some limitations and areas for future research need to be addressed. For one, this study aimed to gain an in depth understanding of adolescents' knowledge and beliefs about body weight and its determinants. It was not conducted with the intention of gathering representative information about the adolescent population or make comparisons between populations with differing BMI scores. While some of the findings of this study may be transferable to members of those populations, they are in no way attempting to generalize.

In addition, this study focused on participants living in low-ses neighbourhoods in two mid-size Ontario cities. The impact of this is that participants are often among the most marginalized within their city but also have greater access to many resources than

other youth (i.e., living in rural centres, homeless). Many of these participants were recruited through local community centres or through snowball sampling and therefore are further connected to local resources and amenities. Youth in higher-SES urban communities, or those in rural communities will likely not share many of the experiences of these participants.

Finally, recruitment and interviews were conducted in English. Given the diverse nature of both cities, this may have excluded some youth from participating if their preferred language of communication was not English.

In summary, this study provides important insight into how adolescents socially construct body weight and understand the determinants of body weight. The overall finding that adolescents viewed obese bodies as the unhealthy product of poor lifestyle choices, and further describe the need for individual agency when navigating the local environments, suggests that despite increasing evidence of its importance, the obesogenic environment is still largely ignored and remains unchallenged.

References

Aphramor, L. (2005) Is A Weight-Centred Health Framework Salutogenic? Some Thoughts on Unhinging Certain Dietary Ideologies. *Social Theory & Health* 3:315-340.

Apparicio, P., Zorica, M & Shearmur, R. (2004). *Evaluation of accessibility to supermarkets in Montreal.* Montreal: INRS- Urbanization, Culture and Society.

Asanin Dean, J. & Elliott, S.J. (2011) Prioritizing Obesity in the City. *Journal of Urban Health*. (In press).

Bauman, K.E. & Ennett, ST. (1996). On the importance of peer influence for adolescent drug use: commonly neglected considerations. *Addiction*, 91 (2), 185-198.

Boehmer, T.K., Hoehner, C.M., Deshpande, A.D., Brennan Ramirez, L.K., & Brownson, R.C. (2007). Perceived and Observed Neighborhood Indicators of Obesity Among Urban Adults. *International Journal of Obesity*, 31(6), 968-977.

Booth, K., Pinkston, M. & Poston, W. (2007). Obesity and the built environment. *Journal of the American Dietetic Association,* 105, S110-S117.

Braziel, J. & LeBesco, K. (2001). *Bodies out of Bounds: Fatness and Transgression.* Los Angeles: University of California Press.

Burdette, A. & Hill, T. (2008). An examination of processes linking perceived neighbourhood disorder and obesity. *Social Science and Medicine*, 67, 38-46.

Campos, P., Saguy, A., Ernsberger, P., Oliver, E. & Gaesser, G. (2006). The epidemiology of overweight and obesity: public health crisis or moral panic? *International Journal of Epidemiology*, 35(1): 55-60.

Carver, A., Timperio, A. & Crawford D. (2008). Playing it safe: The influence of neighbourhood safety on children's physical activity- A review. (2008). *Health & Place*, 14 (2), 217-227.

Carpiano, R. (2009). Come take a walk with me: The "go-along" interview as a novel method for studying the implications of place for health and well-being. *Health & Place,* 15(1); 263-272.

Cohen, D., Finch, B., Bower, A. & Sastry, N. (2006). Collective efficacy and obesity: The potential influence of social factors on health. *Social Science & Medicine*, 62(3): 769–778.

Colls, R. & Evans, B. (2010). Challenging Assumptions: Re-thinking the obesity 'problem'. *Geography*, 95, 99-105.

Davison, K. & Birch, L. (2001). Childhood overweight: A contextual model and recommendations for future research. *Obesity Reviews,* 2(3): 159-171.

Evenson, K., Scott, M., Cohen, D. & Voorhees, C. (2007). Girls' Perception of Neighborhood Factors on Physical Activity, Sedentary Behavior, and BMI *Obesity*, 15, 430–445

Fonesca, H, Gaspar de Matos, M. (2005). Perception of overweight and obesity among Portuguese adolescents: an overview of associated factors. *Eur J Public Health*, 15 (3): 323-328.

Gard, M. & Wright, J. (2005). *The Obesity Epidemic: Science Morality and Ideology.* London: Routledge.

Giddens, A. (1984). *The Constitution of Society: Outline of the Theory of Structuration*. Cambridge: Polity Press.

Harrington, D. & Elliott, S.J. (2009) Weighing the importance of neighbourhood: a multilevel exploration of the determinants of overweight and obesity. *Social Science & Medicine*. 68: 593-600.

Harrington, D. Elliot, SJ., Clarke, AE., Ben-shoshan, M. & Godefroy, S. (2011). On person's peanut is another's poison: Exploring the determinants of the perceived risk of food allergies in Canada. *Human and Ecological Risk Assessment*. (In Press).

Hill, A.J., & Silver, E.K. (1995). Fat, friendless and unhealthy: 9-year old children's perception of body shape stereotypes. *International Journal of Obesity*, 19, 423-430.

Hoek, H. W. (2007). Incidence, prevalence and mortality of anorexia and other eating disorders. *Current Opinion in Psychiatry* 19(4), 389-394.

Janssen, I., Craig, W. M., Boyce, W. F. & Pickett, W. (2004). Associations Between Overweight and Obesity With Bullying Behaviours in School-Age Children. *Pediatrics,* 113(5), 1187-1194.

Joshi, H., Wiggins, R., Bartley, M., Mitchell, R., Gleave, S. and Lynch K. (2000). Putting health inequalities on the map: does where you live matter and why? In: Graham, H. (ed). *Understanding Health Inequalities.* Buckingham: Open University Press. 143-155

Kirby, D. (2001). Understanding What Works and What Doesn't in Reducing Adolescent Sexual Risk-Taking. Family Planning Perspectives, 33(6), 276-281.

Krewski, D., Lemyre, L., Turner, M. C., Lee, J. E. C., Dallaire, C., Bouchard, L., Brand, K., & Mercier, P. (2006). Public Perception of Population Health Risks in Canada: Health Hazards and Sources of information. *Human and Ecological Risk Assessment*, 12(4): 626-644.

Latham, J. & Moffat, T. (2007). Determinants of variation in food cost and availability in two socioeconomically contrasting neighbourhoods of Hamilton, Ontario, Canada. *Health & Place,* 13: 273-287.

LeBesco K. (2004). *Revolting Bodies: The Struggle to Redefine the Fat Identity*. Boston: University of Massachusetts Press.

Leitch, K. (2008). *Reaching for the Top: A Report by the Advisor on Healthy Children and Youth*. Health Canada: Ottawa. Catalogue n. H21-296/2007E

Longhurst R. (2005). Fat bodies: developing geographical research agendas. *Progress in Human Geography*, 29(3)*, 247-259*

Lumeng, J., Appugliese, D., Cabral, H., Bradley, R & Zuckerman, B. (2006). Neighbourhood safety and overweight status in children. *Archives of pediatric and Adolescent Medicine,* 160(1); 25-31.

Mota, J., Almeida, M., Santos, P. and Ribeiro, JC. (2005) Perceived neighborhood environments and physical activity in adolescents. *Preventive Medicine,* 41, 834-836.

Neumark-Sztainer, D., Story, M., Harris, T. (1999). Beliefs and attitudes about obesity among teachers and school health care providers working with adolescents. *Journal of Nutritional Education,* 31, 3-9.

Public Health Agency of Canada (PHAC). (2009) Obesity in Canada- a snapshot. http://www.phac-aspc.gc.ca/publicat/2009/oc/pdf/oc-eng.pdf
Accessed: August 21, 2011.

Pritchard, M.E., King, S.L. & Czajka-Narins, D.M. (1997). Adolescent Body Mass Indices and Self-Perception. *Adolescence*, 32, 863-880.

Puhl, R. & Latner, J. (2007). Stigma, Obesity, and the health of the Nation's Children. *Psychological Bulletin*, 133(4); 557-580.

Raine, K. (2004). 'Obesity' in *Improving the Health of Canadians*. Ottawa: Canadian Institute for Health Information. Pg. 106-147.

Raine K., Spence J., Church J., Boule N., Slater L., Marko J., Gibbons K. & Hemphill E.

(2008). *State of the evidence review on urban health and healthy weights*. Ottawa: Canadian Institute for Health Information.

Robinson, J. (2005). Health at every size: toward a new paradigm of weight and health *Medscape General Medicine,* 7, 3 13.

Romero, A.J. (2005). Low-income neighborhood barriers and resources for adolescents' physical activity. *Journal of Adolescent Health,* 36, 253-259.

Sharkey, J.R. & Horel, S. (2008). Neighborhood Socioeconomic Deprivation and Minority Composition Are Associated with Better Potential Spatial Access to the Ground-Truthed Food Environment in a Large Rural Area, *J Nutr.* 138(3), 620-627

Shields, M. (2005) *Measured Obesity: Overweight Canadian children and adolescents.* Nutrition: Findings from the Canadian Community Health Survey, Statistics Canada,

Smoyer-Tomic, K., Spence, J. & Amrhein, C. (2006). Food deserts in the Prairies? Supermarket accessibility and neighbourhood need in Edmonton, Canada. *The Professional Geographer,* 58(3); 307-326.

Stafford, M., Cummins, S., Ellaway, A., Sacker, A., Wiggins, R. & Macintyre, S. (2008). Pathways to obesity: Identifying local, modifiable determinants of physical activity and diet. *Social Science and Medicine, 65,* 1882-1897.

Swinburn, B., Egger, G., & Raza, F. (1999). Dissecting Obesogenic Environments: The development and application of a framework for identifying and prioritizing environmental interventions for obesity. *Preventive Medicine,* 29, 563-570.

Thompson, S.H., Sargent, R.G., Kemper, K.A. (1996). Black and white adolescent males' perceptions of ideal body size. *Sex Roles*, 34(5-6), 391-406.

Timperio, A., Salmon, J., Telford, A. and Crawford, D. (2005) Perceptions of local neighborhood environments and their relationship to childhood overweight and obesity. *International Journal of Obesity,* 29, 170-175.

Tjepkema, M. (2005). Adult Obesity in Canada: Measured height and weight. *Nutrition: Findings from the Canadian Community Health Survey.* Statistics Canada Catalogue no. 82-MWE2005001.

Trembley, M., Katzmarzyk, P. & Willms, J. (2002). Temporal trends in overweight and obesity in Canada, 1981-1996. *International Journal of Obesity,* 26, 538-543.

Tucker, P., Irwin, J. Gilliland, J., He, M., Larsen, K. and Hess, P. (2009). Environmental influences on physical activity levels in youth. *Health and Place, 15(1); 357-363.*

Vanasse, A., Demers, M. Hemiari, A. & Courteau, J. (2006). Obesity in Canada: where and how many? *International Journal of Obesity,* 30, 677-683.

Vilhjalmsson, R., Kristjansdottir, G. (2003). Gender differences in physical activity in older children and adolescents: The central role of organized sport. *Social Science and Medicine,* 56 (2), 363-374.

White, M. (2006). Food access and obesity. *Obesity Reviews,* 8(1); 99-107.

Wilson K., Elliott S., Law M., Eyles J., Jerrett M. & Keller-Olaman S. (2004). Linking perceptions of neighbourhood to health in Hamilton, Canada. *Journal of Epidemiology and Community Health,* 58(3), 192-198.

World Health Organization (2000) *Obesity: Preventing and Managing the Global Epidemic,* WHO Technical Report Series: 894, Geneva, Switzerland.

CHAPTER FIVE

Discussion and Conclusion

Introduction

Researchers continue to explore the determinants of excess body weight in order to curb the increasing prevalence of obesity (WHO 2011). Increased acknowledgement of the importance of 'obesogenic environments' (i.e., spaces in which individuals are constrained with respect to key determinants of overweight including healthy eating and physical activity) is found in a range of disciplinary literatures including health geography (Davison & Birch, 2001; Egger & Swinburn, 1997; Swinburn, Egger & Raza., 1999). In Canada and elsewhere, neighbourhoods characterized as having low socioeconomic status (SES) have received attention for study and intervention, with a particular focus on related risks to youth (Janssen et al., 2006; Oliver & Hayes, 2005).

This qualitative research program examined the role of local environments in shaping adolescent body weight in low-SES neighbourhoods in Southern Ontario using the ANGELO Framework (Swinburn, Egger & Raza, 1999) in order to address the following objectives:

1) To investigate how obesogenic environments are constructed at the local level
2) To examine the influence of neighbourhood-level factors in the everyday lives of adolescents and how these may influence behaviour related to body weight
3) To explore adolescent perceptions of body weight and the importance placed on environmental determinants.

This chapter provides a summary of key findings; highlights the theoretical, methodological and substantive contributions of the work; and, describes implications and applications for intervention and policy. The chapter concludes with directions for future research.

Summary of Key Findings

In the second chapter of this dissertation, the findings revealed the importance of political and socio-cultural environments in shaping obesogenic environments. In particular, the cities' perspectives on health influenced how they framed the obesity-epidemic and the policies they implemented. The consistency of city-specific discourse across the municipal documents and key informant interviews highlighted the integrated nature of the socio-cultural and political environments, and their influence in shaping the physical and economic environments.

The third chapter found that differences exist in the way adolescents define neighbourhood based on the urban/suburban status of the neighbourhood as well as the characteristics of the participant. The urban status of Hamilton's neighbourhood aligned with census tract boundaries that followed major roads, while Mississauga's suburban neighbourhood was larger to reflect the sprawling city design, and more closely linked to the municipal place name boundaries that residents identify with. In addition, the age, level of mobility and migration status of participants influenced conceptual neighbourhood boundaries and use of space. The findings also highlighted the very social nature of adolescents' use of neighbourhood space.

Findings from the fourth chapter indicated that participants viewed healthy bodies as energetic and able, while obese and thin bodies were viewed as sick. Moreover, participants predominantly focused on the role of individual level factors in shaping body weight, with much emphasis on diet. When discussing environmental determinants, there was a disconnect between perceptions and realities of what exists in the physical and economic environments, while the socio-cultural and political environments were discussed largely as inhibiting access to neighbourhood resources. Neighbourhoods were viewed as tempting and unhealthy places that required self-regulation, implicitly suggesting the importance both structure and agency in determining body weight.

Contributions

This study makes theoretical, methodological and substantive contributions to research literature on obesity, neighbourhoods and health, and adolescent health. Theoretically, contributions surround the use of the ANGELO Framework (Swinburn, Egger & Raza, 1999) for empirical research in contrast to the predominant use of the framework as an organization tool for systematic reviews (Ferreira, 2001; Kirk, Penney & McHugh, 2010; Raine et al., 2008; Van der Horst et al., 2007; Wendel-Vos et al, 2007). The findings from this study show that while the framework is helpful for conceptualizing how various scales and types of environments may influence body weight, isolating these environments proved to be difficult in practice. This is due in large part to the interaction between environmental types (i.e., overlap between the political and socio-cultural factors at the municipal level), and influence of various scales of

environment (i.e., local public health unit priorities determined by provincial and federal health agendas).

Methodologically, this research makes substantial contributions. It highlights the importance of using definitions of neighbourhood that reflect the place and population being studied. Attention to the urban/suburban status of the neighbourhood as well as the age, level of mobility, and migration experience of the population is recommended. Further, studies contemplating a suitable neighbourhood boundary for research with adolescents need to consider the importance of social interaction as a major determinant of how this population uses local space.

A second methodological contribution of this research is the incorporation of multiple qualitative methods (i.e., discourse analysis, in-depth interviews, go-along interviews and community mapping) to study environmental determinants of obesity. This triangulation of data (Farmer et al., 2006) provided a comprehensive picture of the local-level environmental factors that influence body weight, allowed for the emergence of new insights into the relationship between local environments and obesity, and informed new directions for future research (discussed below).

A related methodological contribution was the use of go-along interviews. Although the vast majority of participants preferred not to take part in these (citing weather, time of day, and personal commitments as barriers), go-along interviews proved very useful for ground-truthing perceptual data as well as reversing researcher-subject power dynamics. Walking through the neighbourhood allowed the interviewer to follow up on map or previous interview content (e.g., is this the park you always go to?) and to

ask about neighbourhood resources not mentioned by participants (e.g., do you ever go to that grocery store? Why is that?). Go-along interviews also reversed the traditional power dynamic between researcher and subject (Carpiano, 2009; Limb & Dwyer, 2003) as participants became the expert sharing information about *their* neighbourhood, and were in charge of what they showed, where they walked, and how fast. This qualitative data collection tool has much promise for future environment and health research.

A final methodological contribution of this study involves recruitment of low-SES adolescent populations. Traditional recruitment strategies cited in the literature such as advertisement mail and flyer postings (Tworoger et al., 2002) were relatively ineffective. Despite, the large amount of time and high cost associated with printing and packaging the flyers according to Canada Post guidelines, only a handful of potential participants, in most cases a parent, contacted the researcher. Flyers were often taken down within hours of being posted and yielded very little response from potential participants (n=1). During the delivery and posting of the flyers, visits to a research website increased dramatically although this did not result in increased participation. While the website may have been useful as an informational tool and/or for informed consent, it was not particularly successful as a recruitment tool. The most effective recruitment strategy was information booths at local recreation/community centres. Additionally, allowing interviews to take place outside of the home, providing gift cards to local shopping malls (versus movie theatres, local food outlets or book stores), and conducting interviews immediately resulted in increased participation.

This study has made several substantive contributions that have important implications for policy. Perhaps the most significant is related to examining the political environment, which has been largely ignored by past research (Raine et al., 2008). The data collected in this study has added important insight into the role of municipal policies and practices in the 'obesity epidemic', and highlighted the significant connection between local environmental types that have not been articulated elsewhere in the literature. For instance, the obesogenic environments in the two low-SES neighbourhoods (economic environment) were shaped by the municipal policies of the political environment that were reflective of the city-wide values and attitudes (socio-cultural environment). In turn, these policies and values contribute to the municipal practices that create and maintain the physical environment. Given the interaction between the political environment and others, interventions that target the problematic discourse of municipal policies and practices are an important next step. To illustrate with an example, smoking cessation campaigns have been widely successful in lowering incidence of smoking through the dissemination of discourse that defines smoking as socially unacceptable (Kim & Shanahan, 2003). As a result of this discourse, many individuals who continue to smoke are stigmatized and socially excluded, which some argue leads to further inequity for an already marginalized population (Bayer & Stuber, 2006; Frolich et al., 2010). No doubt, similar campaigns to make obesity and obese bodies deviant and socially unacceptable is problematic and unlikely to reduce health disparities that already exist among this population, therefore the promotion of discourses that are similar to the

Health at Every Size Movement (Aphramor, 2005; Robinson, 2005) have greater potential to minimize the heath impacts of excess body weight.

This research also contributes important perceptual data from adolescents living in low-SES status environments. Their perceptions often reflected current knowledge that states obesity is an individual problem requiring personal control and agency (Campos et al., 2006; Gard & Wright, 2005; LeBesco, 2004), while concomitantly paying little attention to environmental or structural factors (Davison & Birch, 2001; Egger & Swinburn, 1997; Swinburn, Egger & Raza., 1999). Given the current state of adolescents' attitudes towards healthy bodies and body weight, there is a need to design health promotion and intervention strategies that aim to shift public attitudes about healthy body weight. One promising example is the Quebec Charter for Healthy and Diverse Body Image (QCHDBI, 2011), which aims to reduce eating disorders and improve overall body image through the acceptance of various body types. The Charter seeks to shift current perceptions of what is a 'normal', desirable and healthy body, and does so by engaging widespread industries such as the media and fashion industry. This campaign will likely have positive effects on individuals who are stigmatized for excess body weight as well.

Another substantive contribution of this research is the understanding of how adolescents use space in low-SES neighbourhoods. There is an abundance of research that demonstrates the association between local environments and increased rates of obesity (Booth, Pinkston & Poston, 2005; Joshi et al., 2000; White, 2006), but the relevance of certain factors and the specific pathways through which these factors influence body weight are largely unexplained. Knowledge about how adolescents use

neighbourhood space and local resources has confirmed, and in some cases, further explained many of the association found in previous studies (i.e., safety, cost associated with healthy behaviours, mixed land-use), and also sheds light on additional contextual factors (i.e., spaces of social interaction) that shape the behaviour of adolescents. This knowledge is helpful for both future research studies that wish to further examine the pathways through which local environments shape obesity as well as health promotion and intervention strategies that aim to promote healthy behaviour among adolescent populations.

A further contribution of this research is its reiteration of the connection between unhealthy environments and marginalization. In particular, the priorities of participants in this research included settlement and acculturation for newcomers in Mississauga and dealing with mental illness and drug addiction for many Hamilton residents. Even among those participants with the highest BMI scores, the interviews reveled that body weight was often the least of their concerns. The participants in these neighbourhoods were far more influenced by poverty and the socio-political-economic conditions that create impoverished communities. Thus, policies that address poverty will not only improve growing waistlines in these neighbourhoods but also a number of other health and social issues in the process.

Future research directions

This study found important differences between the political and socio-cultural environments in the two cities. However, this study was not able to assess the impact of these differing priorities and values on incidence of excess body weight. Future

longitudinal research is therefore important in order to determine whether modifying these types of environments are effective in reducing obesogenic environments. Moreover, this study it was not able to examine whether the cities' divergent health and obesity discourses influenced the attitudes of residents in the two cities. This was due in large part to a small sample size and the participation of newcomers who had limited exposure to the policies and practices shaped by these discourses. Studies that measure the impact of changing political discourses on population health and/or that compare populations in different political environments would be particularly helpful in the future.

A second area for future research involves the continued examination of neighbourhood definition and use by adolescents. The neighbourhood sample size in this study was small (n=2) and included unique neighbourhoods in terms of location and SES. Future research is needed to confirm the findings of urban and suburban differences between how neighbourhoods are defined. Additionally, because participants were less mobile given their SES, an exploration of how neighbourhoods are used (or not used) by adolescents with higher SES would be important to confirm the findings of this study.

This research found significant interaction between environmental types, but it was clear from this study that the scale of environment is also important to fully grasp how obesogenic environments are shaped. Certainly the municipal public health agendas are in part shaped by the Public Healthy Agency of Canada, likewise the capacity of neighbourhoods to support newcomer settlement and integration depend on regional dissemination of provincial funds, which too rely on federal funding. However, examining these processes at provincial and national scales was beyond the scope of the

current study, although they are integral in fully understanding how local environments are constructed and need to be explored by researchers in the future.

References

Bayer, R. & Stuber, J. (2006). Tobacco control, stigma and public health: rethinking the relations. *American Journal of Public Health*, 96, 47–50.

Booth, K., Pinkston, M. & Poston, W. (2007). Obesity and the built environment. *Journal of the American Dietetic Association,* 105, S110-S117.

Carpiano, R. (2009). Come take a walk with me: The "go-along" interview as a novel method for studying the implications of place for health and well-being. *Health & Place,* 15(1); 263-272.

Cummins, S., Curtis, S., Diez-Roux, A.V. & Macintyre, S. (2007). Understanding and representing 'place' in health research: A relational approach. *Social Science & Medicine* 65, 1825-1838.

Davison, K. & Birch, L. (2001). Childhood overweight: A contextual model and recommendations for future research. *Obesity Reviews,* 2(3): 159-171.

Egger, G. & Swinburn, B. (1997). An 'ecological' approach to the obesity pandemic. *British Medical Journal*, 315: 477-481.

Farmer T, Robinson K, Elliott SJ, Eyles J. Developing and implementing a triangulation protocol for qualitative health research. *Qualitative Health Research*. 2006;16(3): 377-394.

Ferreira, I. (2007). Environmental correlates of physical activity in youth – a review and update. *Obesity Reviews,* 8, 129–154.

Frohlich, K., Poland, B., Mykhalovskiy, E., Alexander, S. & Maule C. (2010).Tobacco control and the inequitable socio-economic distribution of smoking: smokers' discourses and implications for tobacco control. *Critical Public Health*, 20(1); 35-46.

Janssen, I., Boyce, W., Simpson, K. & Pickett, W. (2006). Influence of individual-and area-level measures of socioeconomic status on obesity, unhealthy eating, and physical inactivity in Canadian adolescents. *American Journal of Clinical Nutrition,* 83, 139-145.

Joshi, H., Wiggins, R., Bartley, M., Mitchell, R., Gleave, S. & Lynch K. (2000). Putting health inequalities on the map: does where you live matter and why? In: Graham, H. (ed). *Understanding Health Inequalities.* Buckingham: Open University Press. 143-155

Kirk, S., Penney, T. & McHugh F. (2010). Characterizing the obesogenic environment: the state of the evidence with directions for future research. *Obesity Reviews,* 11, 109-117.

Kim, S. & Shanahan, J. (2003). Stigmatizing smokers: public sentiment toward cigarette smoking and its relationship to smoking behaviours. *Journal of Community Health*, 8, 343–367.

Limb, M. & Dwyer C. (2003). *Qualitative Methodologies for Geographers: Issues and Debates.* London: Oxford University Press.

Oliver, L. & Hayes, M. (2005). Neighbourhood socio-economic status and the prevalence of overweight Canadian children and youth. *Canadian Journal of Public Health*, 96(6); 415-420.

Quebec Chart for Healthy and Diverse Body Images (QCHDBI) (2009). Accessed online from: http://www.ijoinonline.com/en/ on October 13, 2011.

Raine, K., Spence, J., Church, J., et al. (2008). *State of the evidence review on urban health and healthy weights*. Ottawa: Canadian Institute for Health Information.

Swinburn, B., Egger, G., & Raza, F. (1999). Dissecting Obesogenic Environments: The development and application of a framework for identifying and prioritizing environmental interventions for obesity. *Preventive Medicine,* 29, 563-570.

Van der Horst, K., Oenema, A., Ferreira, I., et al. (2007). A systematic review of environmental correlates of obesity-related dietary behaviours in youth. *Health Education Research,* 22(2); 203-226.

Wendel-Vos, W., Droomers, M., Kremers, S., Brug, J. & Van Lenthe, F. (2007). Potential environmental determinants of physical activity in adults: a systematic review. *Obesity Reviews,* 8, 425–440.

White, M. (2006). Food access and obesity. *Obesity Reviews,* 8(1); 99-107.

World Health Organization. (WHO) (2000). *Obesity: Preventing and Managing the Global Epidemic,* WHO Technical Report Series: 894, Geneva, Switzerland.

APPENDICES

Appendices A: Researcher Biography & Reflections

****

Biography

I was born in Toronto, Ontario in 1983. My brother was born eighteen months later, and another eighteen months after that my parents separated and shared custody of us. I grew up in various neighbourhoods in Brampton, a diverse and growing suburb of Toronto. After bouts of single-parenthood, both my parents remarried, and my sister was born in 1997. Due to the nature of joint custody, my brother and I lived in opposite worlds on a weekly basis for much of our childhood as we switched houses. Despite this, I always felt loved and cared for by my immediate and extended families.

Growing up, I lived an economically privileged life playing sports and taking competitive dance lessons and playing musical instruments. I attended Mayfield Secondary School for the Regional Arts Music Program in music (I played the French horn) and had the opportunity to travel throughout North America for dance competitions and workshops. In grade 12, I transferred high schools in order to focus on academic subjects rather than the arts (I choice I regret today) in anticipation of going to medical or law schools. My enjoyment of social science subjects in high school swayed me to pursue the latter option

Upon graduation from high school, I attended the University of Ottawa for Criminology with a new interest in criminal profiling (no doubt sparked by my dad's stories as a police officer). During my first year, my colleagues and I became caught up in a news story about daily shootings of random citizens in Virginia, USA. The best criminal profilers all predicted the 'Virginia Sniper' to be a white, educated, ex-military personnel, and they were all wrong. I decided then that it was not the career path I would be pursuing. Simultaneously, I was thoroughly enjoying my courses in sociology, psychology and especially women's studies and decide to transfer to a university closer to home.

In second year I started at University of Toronto Mississauga in their psychology department with the plan to become a psychologist. After one semester of memorization and multiple-choice exams, I thought I would never last a year in the program let alone earn a PhD. During the holiday break, I looked for social science courses that allowed me to write term papers, give class presentations and, more importantly, still had space for students to enroll. Two of the courses I was able to enroll in had significant impact on my future career path. The first was a trial class offered by the head librarian called Introduction to Scholarly Research. I still think this should be a mandatory class for all undergraduate students. The second course was Population Geography, and it completely opened my eyes to the world of human geography(versus my previous exposure in high school to physical geography), and I loved it.

When I entered my third year of university, I still needed to declare a major. Choosing geography would have added another year to my degree so I opted to major in women's studies and minor in history and geography. Women's studies exposed me to issues of difference and inequality, social justice, and identity, while the minor in history allowed me to explore East Asian, Latin American and South Asian cultures. These interests still influence my research today.

In my final year at UTM, I completed a fourth year honours thesis in geography on neighbourhood determinants of health for immigrant populations in Mississauga where I collaborated with a local neighbourhood centre. I knew from that experience that I enjoyed conducting qualitative research, particularly at the local level, because I felt I could have an impact on the lives of individuals and/or communities. That idealism is still present today.

I pursued a Master's degree at the University of Toronto working with the same supervisor and community partner on research that stemmed from my undergraduate work. At this point, my interest was still in examining social inequity for marginalized populations rather than on health or health geography. Upon completing the degree, I had developed a professional and personal interest in health and the social determinants of health, which I felt were strongly related to inequality. I chose to pursue my doctorate at McMaster University because of its reputation in health geography and proximity to the GTA. My interest in working with Dr. Susan Elliott was in large part due to my desire to see how a woman in academia balances teaching, an active research program, and family (and also in Susan's case: administrative positions at three universities, marathon training, extensive travel, community events…). I was given the option to work on one of Susan's several research programs. The obesity project appealed to me because I was intrigued by the complexity of obesity as well as its impact on self-image and identity particularly for teens who already struggle with these issues.

During my time in graduate school, a number of personal milestones were achieved. I married my long-time boyfriend in 2007, we purchased our first home together in 2008, and had a beautiful baby boy in 2010.

****

Reflections

My white, middle class, liberal identity combined with growing up in a police family, being highly educated and possessing a genuine interest in social justice shaped my experience of this research project. On top of this, my physical appearance also became relevant. For one, the ethics committee decided I looked young enough (and I am sure they said 'non-intimidating') to not pose a threat to participants when walking through their neighbourhood. There was concern that I would 'out' them in some way if I looked older and more like an informant. Outing did not appear to be a concern to any of the teens I met but I suspect that my appearance did help put some participants (and their parents) at ease.

My most problematic attribute was my petite and slim body shape (no doubt a result of high metabolism and exposure to healthy environments that are accessible to most middle-class people). I always did feel a sense of uneasiness when connecting with participants because of my body type, as if I was subconsciously influencing them about what body type my research questions were about. In my field notes I wrote about one of my first interviews where the participant (healthy weight) walks me to the door as we continue our post-interview talk. In the context of her 'being skinny' and having lots of friends she looked at me and matter-of-factly said "*you* know what it's like." I decide from then on I would attempt to hide my body size by wearing looser clothes. I don't think I fooled anyone but I felt more comfortable by the attempt.

A year after the interviews had concluded, I had a temporary change to my body through pregnancy. That experience demonstrated to a small extent, some of the challenges in navigating environments with a bigger body. Whether it be using regular washroom stalls, finding space on the elevator, reaching objects on a counter, comfortably driving a car, or maintaining personal space in crowded areas, it was clear to me that the physical world was built for certain types of bodies. This was not something I fully understood prior to pregnancy, nor will ever completely grasp due to the temporary nature of my weight increase.

My lifelong experience as a slim person also came to haunt me during one of my early interviews. I purchased a weigh scale that was lightweight, easy to read, and affordable (I was conscious of my research budget). As I was walking out of the store I thought I better look at its maximum weight, which was 300 pounds. I thought this would be more than enough for the teens I was working with. One of the first interviews I conducted was my largest (and most timid) participant. When it was time for the measurements, she stepped on the scale and it didn't work. It still didn't work after a second attempt so I asked her to step off because 'I had forgotten to reset it'. Her mom had re-entered the room and accused the participant of breaking my scale. The participant looked back at me and I reassured her that the scale was likely damaged from me dropping it. She asked if she could try one more time. The scale worked and she weighed just under 300 pounds. She said that was less than the last time she weighed herself, and both her and her mom looked content. I was relieved beyond belief and felt like a naive jerk. When I bought that

scale I thought 300 pounds was more than enough, but I had no idea what a 300 pound teenager looked like or how common that weight would be. Right after that interview I went and purchased a new scale with the max weight of 330 pounds (the highest consumer scale sold in five stores I visited). I wish I had considered this prior to commencing the interviews.

I also thought I knew about low-income based on earlier experiences in my own life. When my mom was a single parent we lived in low-income circumstances and for several months after she lost her job I remember things being really financially tight and emotionally tense. But much of my life was spent in middle-class neighbourhoods with middle-class friends doing middle-class things. I am also aware that my father's profession as a police officer resulted in my brother and I being relatively sheltered from certain aspects of the world. Given this background, I felt my eyes had been opened during this study. I still struggle to accept some of the conditions that my participants were exposed to. There were apartments with little furnishings, and houses filled with spoiled food, broken items and garbage ('My mom is a hoarder' stated one participant). Some family members hovered over the participant, another was 'passed out' on the couch, and a few were not home (for days). I will never forget one participant getting excited because she heard her dad was coming to visit that day. When he walked in, he barely acknowledged the participant but went straight to another family member demanding coffee money. Once he received $1.24 in pennies, he came over and intentionally slapped the participant on the back (shortly after she had received medical treatment for back injury) and asked me if I had any money. He left shortly after getting into an argument with another family member about his drug addiction. I remember crying after I left that house thinking about what life must be like for that participant.

I thought a lot about the life circumstances of my participants and compared them to my own life and that of my teenager sister. At the end of the interview I asked participants what their dream life would look like five years in the future. One participant said that she would like to have a good job at a retail store and own an apartment. I realized in that moment the phrase 'everything is relative.' Most participants who grew up in their neighbourhood were accustomed to 'hookers and junkies' on the street, gang tags on school property, and avoiding certain parks because of a stabbing that happened the week before, and they said that these were characteristics of *all* neighbourhoods and that theirs was average. The majority also said that they liked their neighbourhood and that it was a good place to grow up. One part of me was relieved to hear them say that. Who am I to decide what a 'good' neighbourhood looks like? Is there a benefit in them knowing that not all neighbourhoods share these characteristics? Wilkinson argued that relative deprivation is more problematic than absolute deprivation, and I was reminded of that thought on numerous occasions. However, that did not stop me from feeling angry about why this country- that for decades has been one of the top on the human development index- allows its communities to become so marginalized. Why do we find it acceptable that there is a 20-year difference in life expectancy for residents living fifteen minutes apart? Why are students able to get to grade 12 without knowing whether Ontario is the

name of our province or country? I truly believe that if we challenge these larger conditions in which people live, we will make great gains in health and social well-being.

As I hoped, this research project developed my skills as a researcher and better prepared me for my future career. More importantly, it widened my perspective on life, and how people give meaning to their life. It added fuel to a little fire called ‘inequality’ that started within me years ago, but now I am that much more determined to put it out.

Appendices B: Research Ethics Material

****

Letter of Information: Key Informant Interviews
(sent via e-mail)

Hello (enter name),

As (enter position), we would like to request your participation in a research study examining determinants of health for residents in an area of (city) being conducted by researchers at McMaster University. This research is supported by the Canadian Institutes for Health Research (CIHR) and the Heart and Stroke Foundation of Canada.

Purpose of the Study: To understand the environmental determinants of health for residents living in low-income communities in Ontario

Procedures involved in the Research: Key community stakeholders will be asked to take part in an interview lasting approximately one hour, to be scheduled at the convenience of participants, and held at the participant's work office or other convenient location. Participants will be asked ten broad questions about health issues facing residents living in an area of (city). For example, participants will be asked questions such as:
What do you think is the most important health issue facing the general population in this community today?
What is it about this area that would make maintaining a healthy lifestyle difficult for some individuals?
How important are body size and body image to adults in this community?
A full interview script will be sent to participants prior to the interview.

Participation Benefits and Risks: Participation in this study is voluntary. While this study will not benefit participants directly, the results of the interviews will be used to inform health promotion strategies and public health interventions that improve the health of residents in (city). The decision to participate in the research will be kept confidential and all participants will remain anonymous, therefore the risks associated with this study are minimal.

Information about Study Results: All participants will receive a summary of their interview to confirm its accuracy. We expect to have the study completed by approximately November, 2009. If you would like to receive a short summary of the results please let us know.

If you would like to take part in this study, or would like to learn more, please do not hesitate to contact me using the contact information below. If I have not heard back from you within a week, I will call you to see if you are interested in participating.

Thank you,

Jennifer Asanin Dean, MA
Ph.D. Candidate, McMaster University
Hamilton, Ontario
(905)-525-9140 x 20440; **asaninjL@mcmaster.ca**

****

Letter of Information- Adolescents

A Study of the neighbourhood factors Shaping Body Image and Size among Adolescents

Hello (Potential Participant):

Thank you for your interest in learning more about this study on neighbourhoods and health among adolescents in (city). My name is Jennifer and I am a graduate student at McMaster University working under the supervision of Dr. Susan Elliott. We are conducting a study on the neighbourhood factors that shape body image and body size of teenagers aged 13-17. This study is funded by Canadian Institutes for Health Research and has been approved by McMaster University Research Ethics Board.

Participants will be asked to take part in an interview with a student researcher at McMaster University. This interview should last approximately 2 hours and will take place in your neighbourhood and at your home. In this interview, we are going to talk about things like body image, lifestyle choices, factors that influence your decisions about your body and lifestyle, while walking around your neighbourhood. Along the way, you will be asked to highlight those areas where you spend your time (e.g., hanging out with friends, playing sports, shopping). For example, some the questions you will be asked are:

What health issue do you think is of most concern to teenagers today?
How would you describe an unhealthy body?
Do you think most teenagers find it easy or difficult to live a healthy lifestyle?
Would you describe your neighbourhood as a healthy place to live?

Before the walk, you will be asked to make a drawing of your neighbourhood. After the walk, we will return to your home and you will be asked to have your height, weight and waist circumference measured using a portable scale and measuring tape. Finally, you will be asked to fill out a one page survey where we will ask you for some information like your age and education. We will be tape recording to the interview so that we can type out the interview at a later date. In appreciation of your time, you will receive a $20 honorarium.

If you are interested in participating, we can book a time for the interview either after school or on the weekends. Before the interview, both you and your parent will have to sign a consent form which talks about your rights as a research participants. It is important for you to know that everything you do and say during the interview will be kept completely confidential.

Do you have any questions about this research or the interview process that I can answer for you now?

Please do not hesitate to contact me if you have any further questions about the study. If you would like to participate we can schedule interview times and setting for you. I can be reached by phone at 905-525-9140 x 20440, or e-mail at healthyu@mcmaster.ca

Thank you,

Jennifer Asanin Dean, M.A.
PhD Candidate

****

Informed Consent Form- Key Informants

July 1, 2009

Examining environmental determinants of health for residents in (city), Ontario

Informed Consent Form

Investigators:

Principal Investigator: Jennifer Asanin Dean, PhD Candidate
School of Geography and Earth Sciences
McMaster University
Hamilton, Ontario, Canada
(905) 525-9140 ext. 20440
asaninjL@mcmaster.ca

Research Supervisor: Dr. Susan Elliott
School of Geography and Earth Sciences
McMaster University
Hamilton, Ontario, Canada
(905) 525-9140 ext. 26516
elliotts@mcmaster.ca

Purpose of the Study: To understand the environmental determinants of health for residents living in low-income neighbourhoods in Ontario. More specifically, this research will explore the socio-cultural environment in low-socio-economic status (SES) communities and how this influences the health of adolescents. This study is supported by two major funding agencies in Canada (Canadian Institutes for Health Research and the Heart and Stroke Foundation of Canada).

Research Process: Interviews with key community stakeholders will take place in person and will last approximately one hour in the participant's office or another convenient location. During this time, participants will be asked about the health of residents, as well as the local-level determinants of health for residents living in a low-SES area in Hamilton. All interviews will be audio-recorded pending consent from the participant.

Participation Benefits and Risks: While this study will not benefit participants directly, the results of the interviews will be used to inform health promotion strategies and public health interventions that improve the health of residents in Hamilton. The risks associated with this study are minimal. Some of the questions may cause you to think about issues that you feel strongly about. You may also worry about others will react to what you say. You are not required to answer questions that you would prefer to skip. You are also free to stop the interview at any point. The steps we are taking to protect your identity are discussed below.

Confidentially: The choice to participate in this study will be kept completely confidential. We will make every effort to protect your privacy. We will not be using your name or identifying you by your position/role in the community. However, we are often identifiable in the stories we tell, references we make or views we express. Please keep this in mind while you are participating.

Only this consent form will contain the name of the participants, which will be kept in a locked cabinet in the researcher's office until the study is complete. All audio recordings and transcripts will also be securely stored by the researcher at McMaster University. All original data will be deleted and shredded once the study has been completed.

Participation: Participation in this study is voluntary. You may withdraw at any time or even after you have signed this consent form without any consequence to you or your organization. You may also choose to skip any question you are not comfortable with and still remain in the study. If you choose to withdraw from the study, any data you have provided will be destroyed unless you indicate otherwise.

Information about Study Results: All participants will receive a summary of their interview to confirm its accuracy. We expect to have this phase of the study completed by approximately November, 2009. If you would like to receive a short summary of the results please let us know.

Information about Participating as a Study Subject: If you have questions or require more information about the study, please feel free to ask them now. If you have additionally questions about the study after you have participated, please contact Jennifer Asanin Dean by phone (906-525-9140 x 20440) or e-mail (ASANINJL@mcmaster.ca).
This study has been reviewed and approved by the McMaster Research Ethics Board. If you have concerns or questions about your rights as a participant or about the way the study is conducted, you may contact:

McMaster Research Ethics Board Secretariat
Telephone: (905) 525-9140 ext. 23142
c/o Office of Research Services
E-mail: ethicsoffice@mcmaster.ca

CONSENT

I have read the information presented in the information letter about a study being conducted by Jennifer Asanin Dean and Dr. Susan Elliott, of McMaster University. I have had the opportunity to ask questions about my involvement in this study, and to receive any additional details I wanted to know about the study. I understand that I may withdraw from the study at any time, if I choose to do so, and I agree to participate in this study. I have been given a copy of this form.

_____ _____
Name of Participant Date

_____
Signature of Participant

****

Informed Consent Form- Adolescents

A Study of the Factors Shaping Body Image among Adolescents

Investigators:
Principal Investigator: Jennifer Asanin Dean
School of Geography and Earth Sciences
McMaster University
Hamilton, Ontario, Canada
(905) 525-9140 ext. 20440

Co-Investigator Dr. Susan Elliott
School of Geography and Earth Sciences
McMaster University
Hamilton, Ontario, Canada
(905) 525-9140 ext. 23139

Why are we doing this study?

In this study, we want to explore the neighbourhood factors that shape body image and body size in youth aged 13-17. We are interested in understanding what adolescents perceive to be an ideal body image and where many of these perceptions come from. We are also hoping to understand what role neighbourhood play in determining adolescent body size.

What will happen during the study?

You will be asked to take part in an interview with a student researcher at McMaster University. This interview should last approximately 2 hours and will take place in your neighbourhood and at your home. In this interview, we are going to talk about things like body image, lifestyle choices, factors that influence your decisions about your body and lifestyle, while walking around your neighbourhood. Along the way, you will be asked to highlight those areas where you spend your time (e.g., hanging out with friends, playing sports, shopping). For example, some the questions you will be asked are:

What health issue do you think is of most concern to teenagers today?
How would you describe an unhealthy body?
Do you think most teenagers find it easy or difficult to live a healthy lifestyle?
Would you describe your neighbourhood as a healthy place to live?

Before the walk, you will be asked to make a drawing of your neighbourhood. After the walk, we will return to your home and you will be asked to have your height, weight and waist circumference measured using a portable scale and measuring tape. Finally, you will be asked to fill out a one page survey where we will ask you for some information like your age and education. We will be tape recording to the interview so that we can type out the interview at a later date.

Will anything bad happen during the study?

It is not likely that anything bad will happen if you choose to participate in the study. However, you may feel uncomfortable or embarrassed by some the questions being asked. You do not have to answer questions that make you uncomfortable or that you do not want to answer.

What good things could happen if I participate?

We hope that what we will learn from you will help us understand more about what adolescents think about body image and body size, and what the most important factors contributing to body size are. This could help this city and others design health programs for youth.

Will I be paid for being a participant in this study?

You will be given a $20 gift card for your participation in the study. This is to thank you for taking the time to participate in the study.

Who will know what I said or did in the study?

Anything that you say or do in the study will not be told to anyone else, including your parents. No one will know you have participated in this study unless you choose to tell them. Anything that we find out about you that could identify you will not be told to anyone else, and we will not be using your name on any presentations or papers about this research.

The information obtained by me will be kept private, stored in a locked cabinet at McMaster University, and only available to myself. Once the study is over, all the information will be disposed of.

What if I change my mind about participating in the study?

It is your choice to be part of the study or not. If you decide to participate, you can decide to stop at any time, even after signing the consent form or part-way through the study. If you decide to stop participating, there will be no consequences to you. If you do not want to answer some of the questions you do not have to, but you can still be in the study.

What happens when I am finished participating in the study?

After you have finished the interview and survey, the researchers will type up a summary report of what you discussed. You will be e-mailed a copy of this summary and asked to make sure it is the same as what you remember of the interview.

If you are interested in receiving a report of the entire study once it is finished, please fill out a contact form so that it can be sent to you.

What are my rights?

If you have questions or require more information about the study itself, please contact Jennifer Asanin Dean by phone (906-525-9140 x 20440) or e-mail (healthyu@mcmaster.ca). You may also contact my supervisor Dr. Susan Elliott at elliotts@mcmaster.ca.

This study has been reviewed and approved by the McMaster Research Ethics Board. If you have concerns or questions about your rights as a participant or about the way the study is conducted, you may contact:

McMaster Research Ethics Board Secretariat
Telephone: (905) 525-9140 ext. 23142
c/o Office of Research Services
E-mail: ethicsoffice@mcmaster.ca

CONSENT FORM

I have read the information presented in the information letter about a study being conducted by Jennifer Asanin Dean and Dr. Susan Elliott, of McMaster University. I have had the opportunity to ask questions about my involvement in this study, and to receive any additional details I wanted to know about the study. I understand that I may withdraw from the study at any time, if I choose to do so. I agree to participate in this study and I understand that I may skip any question I do not want to answer. I have been given a copy of this form.

☐ **YES** ☐ **NO**

Participant Name :_____(Please Print)

Participant Signature: _____

Parent/Guardian Signature: _____

Date: _____

Appendices C: Data Collection Tools

****

Community Stakeholder Interview Questions

General Neighbourhood Questions

1) How long have you worked in this community for?
    a. What did you do before?
    b. Where did you go to school?
    c. How long have you worked with the adolescent population (if applicable)?

2) How would you describe this city/neighbourhood?
    a. What are its positive attributes?
    b. What are its negative attributes?

3) What are the issues of most concern in this city/neighbourhood?

Health Questions

4) What do you think is the most important health issue facing the general population in this city/neighbourhood today?
    a. For the adolescents in this city/neighbourhood?
    b. Where do you think the following health risks rank in comparison to (issue from 4)? Why?
        i. Food Allergies
        ii. Smoking
        iii. Obesity
        iv. Stress
        v. Crime
        vi. Pollution (pesticides, smog)
        vii. Automobile accidents
        viii. Bacteria in food
        ix. Anything other risks not mentioned that you think are important?

    c. Where do you think the following health risks rank in comparison to (issue from 4a)? Why?
        i. Food Allergies
        ii. Smoking
        iii. Obesity
        iv. Stress
        v. Crime
        vi. Pollution (pesticides, smog)
        vii. Automobile accidents
        viii. Bacteria in food
        ix. Anything other risks you think are important?

5) How important do you think it is for the general population in this city/neighbourhood to maintain a healthy lifestyle? Why?

a. For adolescents in this city/neighbourhood?
b. Would this be the same for people of different genders? Ethnicities? Income levels? Newcomers to the country? People with disabilities? People with different sexual orientation?

6) What is it about this city/neighbourhood that would make maintaining a healthy lifestyle difficult for some individuals? Easy for some individuals? Why?
    a. What would be the differences, if any, between adolescents, children and adults?

7) Overall would you consider this city/neighbourhood to be good or bad for the health of residents? Why?

Body and Health

8) What does a healthy body look like?
    a. What about size, shape?
    b. Where do you think you got this information from?

9) How important are body size and body image to adults in this community?
    a. Do you think it will be more or less important for adolescents? Why?

10) Where do you think adolescents develop ideals of body size and body image from?
    a. What role, if any, do you think neighbourhood factors would play?

Influence of Health on Work

11) How important are issues of health in the work you do for this community?
    a. Why is that?
    b. Do any of the issues we just discussed ever come up in the work that you do?

12) What policies/practices guide your work regarding the health of individuals in this community?
    a. Are these policy documents publicly available? Where are they accessible?

13) Is there anything else you would like to add about health is this community? Body size? Adolescent health? Other?

****

Adolescent Interview Guide

Examining neighbourhood-level environmental determinants of adolescent body weight in low-

socioeconomic status neighbourhoods in Ontario		
Purpose of Checklist: To understand the neighbourhood-level determinants of adolescent body weight according to youth living in low-ses neighbourhoods. This checklist will guide the collection of perceptual data on issues such as the neighbourhood, health, healthy bodies and healthy lifestyles.		
Construct	**Question**	**Probes**
Perception of neighbourhood boundaries	Before we start the interview, I am going to ask you to take some time to draw a map of your neighbourhood. Please highlight your house and other places that may be important to you.	-include anything that you think is important -there are no restrictions to what you can include -where do you hang out with your friends? -where do you engage in PA? -where do you eat?
Concept of neighbourhood -nb description -as place to live -likes and dislikes -determinant of health	Great! Thank you for doing that. Now I am going to ask you about your neighbourhood…. How would you describe your neighbourhood? What do you like most/least about living here? Do you think it is a good place for teenagers to grown up? Would you describe your neighbourhood as a healthy place to live?	-clarification of picture contents -safety, cleanliness -features/amenities -people who live there -size -why is that? What would make it better for teenagers? -what makes it healthy/unhealthy?
Values/concepts of the body -Healthy body size -Determinants of body size -body image -health issues	Okay, let's change topics now and focus more on health… How would you describe a healthy body? How would you describe an unhealthy body? What factors create a	 -Physical (size, shape, ability, hair teeth, hands, feet) -Mentally (stress, self-esteem, positive attitude) -genes

	healthy body? Where do you think you developed this idea of what a healthy body is? Would you describe your own body as healthy? If you could change anything about your body would you?	-lifestyle -perspective of others -family -school -friends -media -why is that? -what would it be?
Body in neighbourhood	I would like you to add a little more to this map of your neighbourhood. Can you please highlight the areas in your nb where you are most comfortable with your body and least comfortable with your body? You are welcome to make any changes you want to the initial map.	-what is it about (place) that makes you feel good about your body? -what is it about (place) that makes you fell uncomfortable with your body? -how long has this been true for you? -do you think other teenagers feel the same way?
Use of neighbourhood space	Now it's time to go for a walk around your neighbourhood. I'd like to see some of the places on your drawing here, so let's pretend I just moved here and you were giving me a tour of all the places I should know about as a teenager living in this neighbourhood.	-hang out with friends -get food from -route to school -extra-curricular activities -places to avoid -anything else important to a teenager During walk… -how often do you come here? -who do you come here with? -when in the day do you come here? -what do you do here? -why don't you go there? -where is (place) from your map?
Health concerns **-**major health concerns for teens -magnitude of obesity issue -healthy lifestyle	To be asked while we are walking around the neighbourhood… What health issue do you think is of most concern to teenagers today?	 -why do you say that?

	Where do you think (issue) ranks in comparison?	- food allergies - smoking - obesity - STIs - crime - pollution - automobile accidents - eating disorders - depression
	What do you consider to be a healthy lifestyle?	-diet -physical activity -smoking -stress -sleep
	How important is living a healthy lifestyle for most teenagers? What about for you?	-why do you say that?
	Do you think most teenagers find it easy or difficult to live a healthy lifestyle? For you?	-easier for some? (sex, age, income, ethnicity, ability, sexuality)
	What in your neighbourhood makes it easy or difficult for you to live a healthy lifestyle?	-availability -access -cost -knowledge -peer pressure
	Can you tell me about a typical day in your life starting from when you wake up to when you go to bed?	-when do you wake up/sleep? -what/when do you eat? -physical activity? -time in the nb? -common day for most of your friends?
	If you could change anything about your lifestyle would you?	-what would you change? Why is that?
Concluding	You showed me some interesting places like (names of stops during the walk), is there anything else you want to show me	

	on the walk? So we have spent some time talking about healthy bodies and health lifestyles and you have said (brief summary) is there anything you would like to add?	

****

Participant Survey- Adolescents

Please tell us more about you

Gender: ___ Female ___ Male **Country of Birth:**_____

Age:
___ 13
___ 14
___ 15
___ 16
___ 17

Grade:
___ 6
___ 7
___ 8
___ 9
___ 10
___ 11
___ 12

How long have you lived in Canada? _____ Years _____ Months

On average, how many hours *per week* do you participate in physical activity? _____
How much of this is in school _____, outside of school____
Please list the types of activities you engage in on a weekly basis (e.g. sports team, hanging out with friends, walking to school):
_____
_____
_____

On average, how many meals *per week* do you eat outside of your home?_____
How many of these are breakfast ___, lunch___ or dinner___
Please list the places you go most often to eat outside of the home (e.g., friends house, restaurant name, cafeteria at school):
_____
_____
_____

On average, how many hours *per day* do you watch television, play video games, read books/magazines, talk on the phone and/or sit at the computer? _____
Which of these do you do most often? _____

Where in the neighbourhood are your favorite places to hang out?
_____

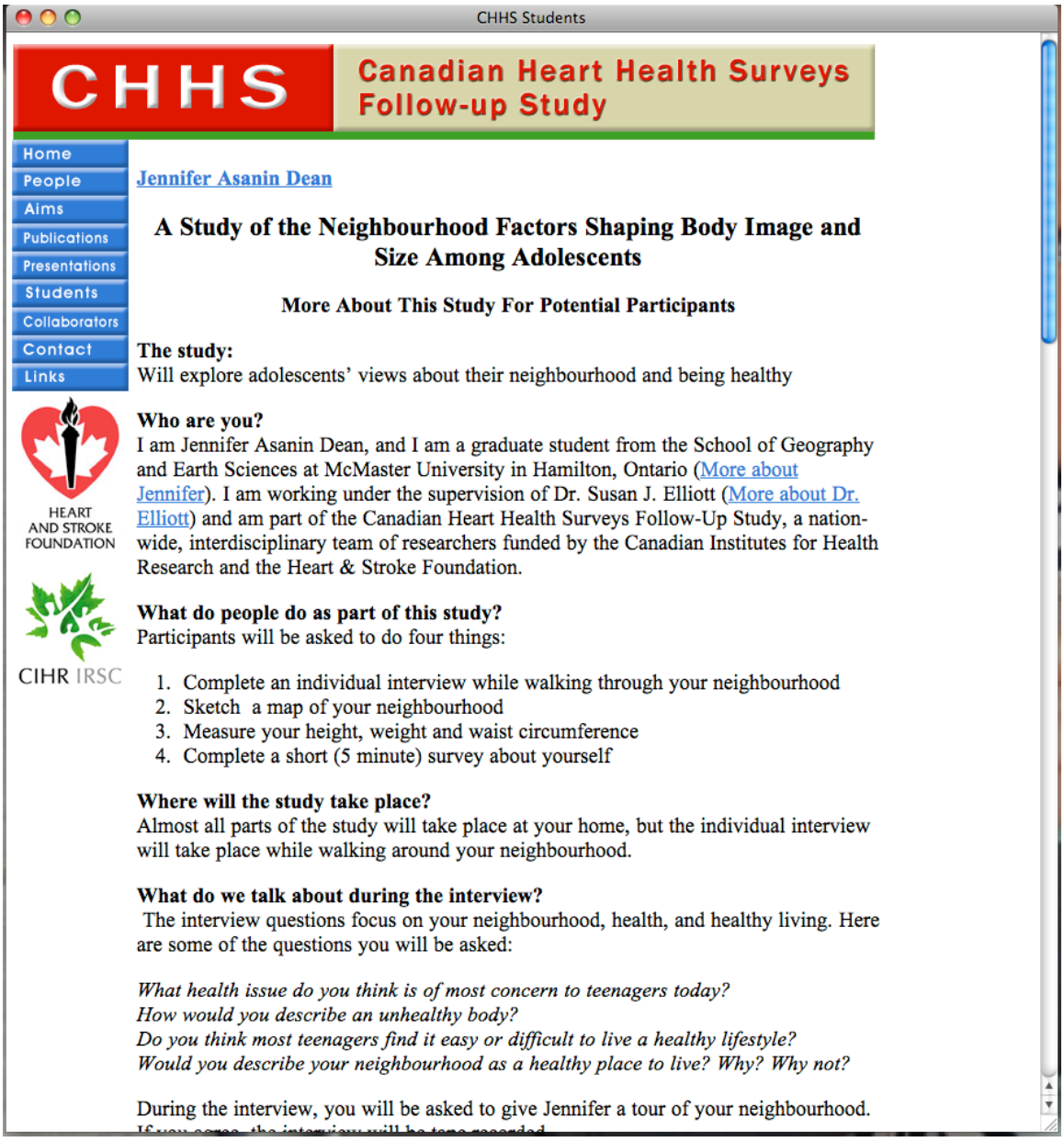
Please describe what a healthy body looks like:
_____
_____
_____

THANK YOU!

Appendices D: Recruitment Tools

****

Research Website


CHHS Students
CHHS
Canadian Heart Health Surveys
Follow-up Study
Home
People
Aims
Publications
Presentations
Students
Collaborators
Contact
Links
HEART AND STROKE FOUNDATION
CIHR IRSC
Jennifer Asanin Dean
A Study of the Neighbourhood Factors Shaping Body Image and Size Among Adolescents
More About This Study For Potential Participants
The study:
Will explore adolescents' views about their neighbourhood and being healthy
Who are you?
I am Jennifer Asanin Dean, and I am a graduate student from the School of Geography and Earth Sciences at McMaster University in Hamilton, Ontario (More about Jennifer). I am working under the supervision of Dr. Susan J. Elliott (More about Dr. Elliott) and am part of the Canadian Heart Health Surveys Follow-Up Study, a nation-wide, interdisciplinary team of researchers funded by the Canadian Institutes for Health Research and the Heart & Stroke Foundation.
What do people do as part of this study?
Participants will be asked to do four things:
1. Complete an individual interview while walking through your neighbourhood
2. Sketch a map of your neighbourhood
3. Measure your height, weight and waist circumference
4. Complete a short (5 minute) survey about yourself
Where will the study take place?
Almost all parts of the study will take place at your home, but the individual interview will take place while walking around your neighbourhood.
What do we talk about during the interview?
The interview questions focus on your neighbourhood, health, and healthy living. Here are some of the questions you will be asked:
What health issue do you think is of most concern to teenagers today?
How would you describe an unhealthy body?
Do you think most teenagers find it easy or difficult to live a healthy lifestyle?
Would you describe your neighbourhood as a healthy place to live? Why? Why not?
During the interview, you will be asked to give Jennifer a tour of your neighbourhood.

CHHS Students

During the interview, you will be asked to give Jennifer a tour of your neighbourhood. If you agree, the interview will be tape recorded.

~Watch a video about the interview process~

How long does it take to participate in the study?
The entire process should take about two hours.

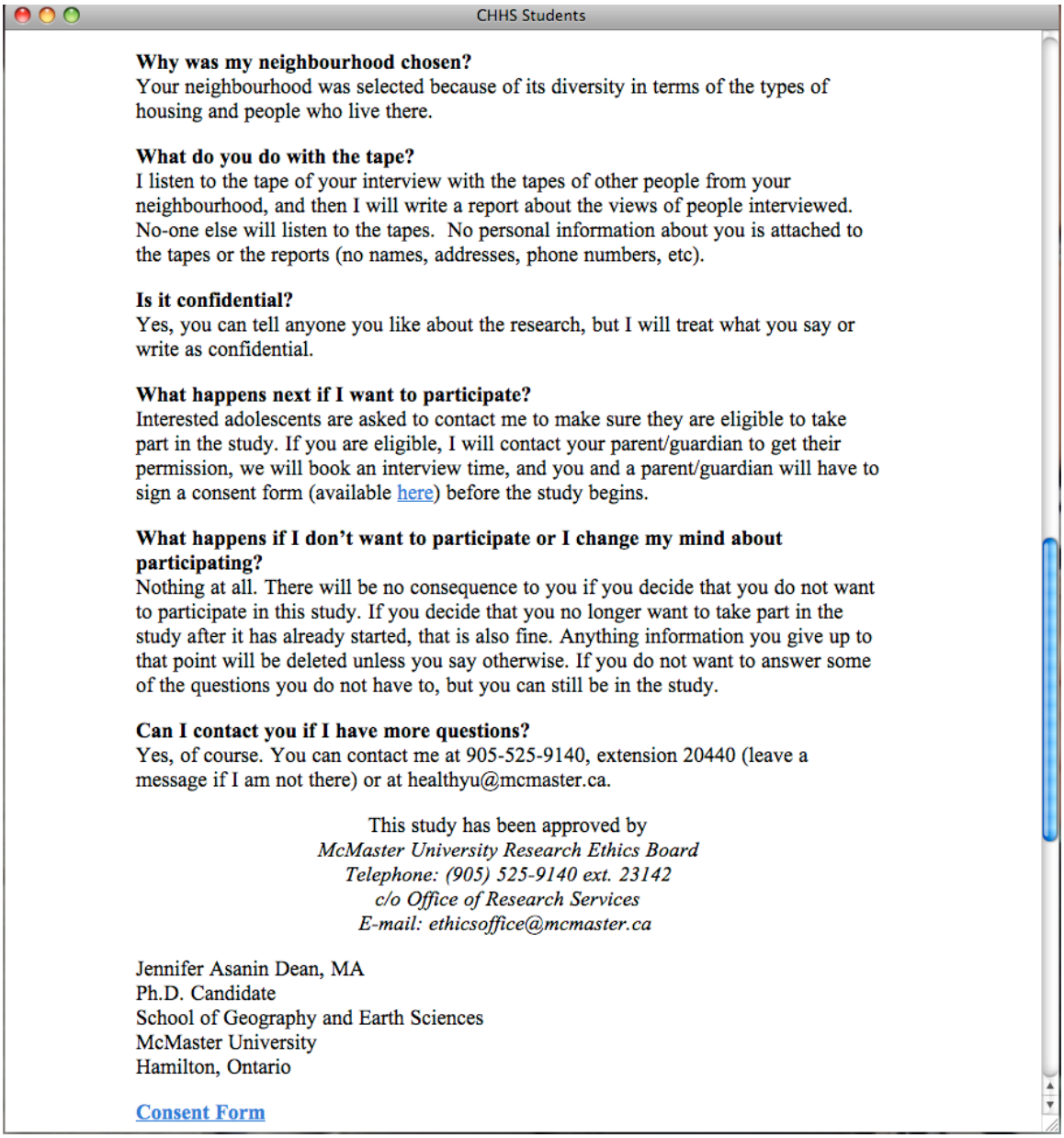
Will I be paid for taking part in this study?
Participation in this study is voluntary but participants will be given a $25 gift card in appreciation of their participation.

Why was my neighbourhood chosen?
Your neighbourhood was selected because of its diversity in terms of the types of housing and people who live there.

What do you do with the tape?
I listen to the tape of your interview with the tapes of other people from your neighbourhood, and then I will write a report about the views of people interviewed. No-one else will listen to the tapes. No personal information about you is attached to the tapes or the reports (no names, addresses, phone numbers, etc).

Is it confidential?
Yes, you can tell anyone you like about the research, but I will treat what you say or write as confidential.

What happens next if I want to participate?
Interested adolescents are asked to contact me to make sure they are eligible to take



CHHS Students

Why was my neighbourhood chosen?
Your neighbourhood was selected because of its diversity in terms of the types of housing and people who live there.

What do you do with the tape?
I listen to the tape of your interview with the tapes of other people from your neighbourhood, and then I will write a report about the views of people interviewed. No-one else will listen to the tapes. No personal information about you is attached to the tapes or the reports (no names, addresses, phone numbers, etc).

Is it confidential?
Yes, you can tell anyone you like about the research, but I will treat what you say or write as confidential.

What happens next if I want to participate?
Interested adolescents are asked to contact me to make sure they are eligible to take part in the study. If you are eligible, I will contact your parent/guardian to get their permission, we will book an interview time, and you and a parent/guardian will have to sign a consent form (available here) before the study begins.

What happens if I don't want to participate or I change my mind about participating?
Nothing at all. There will be no consequence to you if you decide that you do not want to participate in this study. If you decide that you no longer want to take part in the study after it has already started, that is also fine. Anything information you give up to that point will be deleted unless you say otherwise. If you do not want to answer some of the questions you do not have to, but you can still be in the study.

Can I contact you if I have more questions?
Yes, of course. You can contact me at 905-525-9140, extension 20440 (leave a message if I am not there) or at healthyu@mcmaster.ca.

This study has been approved by
McMaster University Research Ethics Board
Telephone: (905) 525-9140 ext. 23142
c/o Office of Research Services
E-mail: ethicsoffice@mcmaster.ca

Jennifer Asanin Dean, MA
Ph.D. Candidate
School of Geography and Earth Sciences
McMaster University
Hamilton, Ontario

Consent Form

****

Recruitment Flyer

Researchers from **McMaster University** are conducting a study about healthy living with adolescents in your neighbourhood!

If you are between the ages of 13 - 17,
we are interested in your opinions on:

- **Your neighbourhood**
- **Healthy living**
- **Body shape and body image**

For more information,
please contact:
Jennifer: Researcher
Phone: 905-525-9140 x20440
E-mail: healthyu@mcmaster.ca

McMaster University
Inspiring Innovation and Discovery

Or visit:
http://www.science.mcmaster.ca/~chhsnet/students2healthyu

Participants will take part in an interview and receive a gift card in appreciation of their time!