



Health in Hamilton neighbourhoods: Exploring the determinants of health at the local level

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ABSTRACT

The population health perspective recognizes a broad range of characteristics that are thought to be important determinants of health. In Canada, 12 such determinants of health are recognized, which range from lifestyle practices and the use of health care services to social and physical environments. While the list of social determinants is quite exhaustive, few studies have examined the relative importance of these determinants. The intent of this paper is to examine the relative importance of a range of social determinants of health in predicting four health outcomes of interest using data from a neighbourhood-level cross-sectional health survey conducted in Hamilton, Ontario. The results show that key social determinants of health vary by health outcome. The significance of the findings is discussed in terms of policy relevance and future research.

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Introduction

A great deal of research has explored the extent to which health is influenced by the characteristics of individuals and/or their social and physical environments. The social (or non-medical) determinants of health (SDOH) have further become an important dimension of policy discourse, although which ones can be influenced and in which ways remains a matter of debate (Wilkinson and Marmot, 2003; Irwin et al., 2006; Collins et al., 2007; Frankish et al., 2007). But much policy discourse has in fact continued to add determinants to the list of characteristics seen as important to shaping health. In Canada the first listing of determinants came from the 1974 Lalonde report entitled *New Perspective on the Health of Canadians*, which identified human biology, environment, life style, and health systems (Lalonde, 1974). The Canadian Institute of Advanced Research expanded those to include different types of behaviour (e.g., smoking, work relationships) and environment (physical and social) as well as individual sociodemographic characteristics and responses to illness episodes (Mustard and Frank, 2004). These ideas have now been formally taken up and further developed by national agencies so that there now exists a 12 item list of health determinants, established by the Public Health Agency of Canada,

which inform the development of healthy public policy (Canada, 2003). These are income and social status, social support networks, education and literacy, employment/working conditions, social environments, physical environments, personal health practices and coping skills, healthy child development, biology and genetic endowment, health services, gender, and culture. While this represents a comprehensive list, research has yet to explore the relative importance of these determinants in the context of different health outcomes. Such an exploration is likely to be useful for the development of healthy public policy and health promotion strategies. Thus, in this paper we seek to examine the relationships between these factors with respect to different health outcomes. We do this using data from a neighbourhood-level cross-sectional health survey as the significance of the local for health status is now well established.

There has been much research activity focused on some but not all of the characteristics that shape the health of populations variously defined. For example, one of the earliest factors associated with health status was access to and utilization of health care services (Roos and Mustard, 1997). Research has also identified some of the other key associations between health and its determinants, such as the relationship between poor health and low income, low levels of education, employment status and conditions, poor social environments, and various sociodemographic characteristics (age, gender; Adams et al., 1998; Blakely et al., 2002; Macintyre et al., 2003; Malmstrom et al., 1999; Manderbacka et al., 1999). In addition, it has been noted that

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health status varies by culture and/or ethnicity (Newbold and Danforth, 2003; Yu et al., 2004). Social support has long been recognized as an important determinant of health (Kamrul Islam et al., 2006, see also Warr, 2006). In terms of personal health practices and coping skills, many studies have demonstrated links between poor health, smoking, and physical inactivity. Recent interest has focused on physical inactivity as part of the obesity epidemic. This epidemic has been linked, along with other factors such as genetics and diet, to suburban design and its role in supporting physical activity (Frank et al., 2005; Frumkin, 2002). Research has shown that a lack of physical activity is associated with sprawl and linked to respiratory and cardiovascular diseases (Frumkin, 2002) as well as obesity (Andersen et al., 2002; Frank et al., 2005; Hoehner et al., 2005; Kelly-Schwartz et al., 2004; Lopez, 2004; Saelens et al., 2003). Poor health is also seen as being associated with poor physical environments such as housing quality and toxic environments (Clapp et al., 2006; Dunn, 2002; Elliott et al., 1999; Macintyre et al., 2003).

Although much of the research on the SDOH has focused on national and international levels, there is growing interest in looking at health at the local level. For example, research has looked at the impact of disadvantaged neighbourhoods on health (Cummins et al., 2005; Pampalon et al., 2007), although this notion has been challenged in studies by Pearce et al. (2007) in New Zealand and van Hooijdonk et al. (2007) in the Netherlands. Links have also been made between local-area variations and different measures of health status (Sooman and Macintyre, 1995). Pampalon et al. (2007) have examined the relationships between neighbourhood perceptions and self-assessed health status, mastery, and control in Quebec City. Mental health outcomes (Fone et al., 2007), heart disease (Cubbin and Winkleby, 2005; Diez Roux et al., 2004), and chronic conditions (Janghorbani et al., 2007) have all been associated with varying neighbourhood characteristics. Significant relationships have also been identified between neighbourhood problems (traffic density, pollution, dirt, noise, absence of amenities, threats to self and property) and impaired physical function, self-rated health, and psychological distress. Deteriorated neighbourhood environments have also been linked to increased stress and depression (Campbell, 1983; Evans, 2003; Latkin and Curry, 2003). In fact this linkage between psychological process, neighbourhood, and health has been seen as key in recent research (Warr et al., 2007; Poetz et al., 2007). Furthermore, it has been suggested that neighbourhood has a multidimensional impact on health (see Parkes and Kearns, 2006). But these conclusions come primarily from studies that examine specific determinants of health for discrete health outcomes. Therefore in this paper we examine the relative importance of the determinants for different health outcomes for the same population living in four neighbourhoods in Hamilton, Ontario. In doing so, we therefore seek to examine the importance of neighbourhood as a social determinant of various health outcomes.

Methods

Research setting

This study took place in four distinct neighbourhoods in Hamilton, Ontario, an industrial city in Canada, located on the western tip of Lake Ontario, about 60 km southwest of Toronto (population at the time of the study ~490,000 (Statistics Canada, 2007)). Data came from a cross-sectional survey, designed to assess determinants of health at the local-level. In brief, neighbourhoods were selected through a combination of statistical methods that utilized socioeconomic and demographic data extracted at the census tract level from the 1996 Census of Canada (data were

taken from this year as the 2001 census data had not been released at the time of our study) in conjunction with smoking data from a random survey of Canadian adults, including Hamilton (see Manfreda et al., 2001). Principal Component Analysis (PCA), local indicators of spatial association (LISA), and geographical information systems (GIS) were used to identify neighbourhoods representing clusters of 17 socioeconomic and demographic determinants of health and related risk factors (see Luginaah et al., 2001 for a full discussion of neighbourhood selection criteria). This analysis was coupled with qualitative interviews with prominent local decision makers and key informants, which identified similar boundaries for the study neighbourhoods. The selected neighbourhoods displayed various combinations of economic wealth and social diversity, including high versus low socioeconomic status (SES; e.g., income, education, housing tenure) as well as high versus low social and demographic diversity (e.g., percent married, average age, lack or presence of recent immigrants, visible minorities, etc.). The neighbourhoods selected are referred to as: the Downtown Core, Chedoke-Kirkendall, Northeast Industrial, and the Southwest Mountain.

The Downtown Core is characterized by high diversity, a high proportion of rental apartments, and low SES. The Northeast Industrial neighbourhood is close to two highly visible steel industries and is characterized by low SES and low diversity. Chedoke-Kirkendall is a high-SES and high-diversity neighbourhood and the Southwest Mountain is a relatively new residential area, elevated above the central city by the Niagara escarpment and has low diversity and high SES.

Study design

The sampling frame for the telephone survey was obtained from tax assessment records provided by City of Hamilton officials. This database provided the names and addresses of potential respondents, and telephone numbers were then sought using the Canada 411 Internet locator service. Prior to data collection, ethics approval from the University Research Board was obtained. An introductory letter from the research team was sent to approximately 2500 potential respondents, informing households about the study. Between November 2001 and April 2002, a telephone survey was administered to approximately 300 individuals living in randomly selected households, aged 18 years and older, from each neighbourhood. Only one survey was completed per household. Individuals with the most recent birthday were selected to complete the survey. All telephone numbers received a minimum of 12 call attempts and, to maximise the likelihood of finding respondents at home, calls were scheduled during the day, evening, and weekend hours. The final response rate was approximately 61 percent. The survey contained a range of questions designed to measure health status along with various SDOH. As is common with telephone surveys, our sample has higher levels of SES (i.e., household income, education, housing tenure) than the general population (Grube, 1997; Purdiel et al., 2002).

Measuring the social determinants of health

In our analysis, we have selected 11 of the 12 SDOH identified by the Public Health Agency of Canada, the exception being early childhood development (which we were unable to measure in our adult population survey; see Table 1). In the following discussion we reference the importance of these determinants in the Canadian context. *Income/social status* (see Raphael, 2004) is represented by household income and is divided into four

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