RESEARCH REPORT

External Research Program

Housing, Social Inequality and Population Health in Vancouver Neighbourhood Areas

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Housing, Social Inequality and Population Health in Vancouver Neighbourhood Areas

submitted to:

Canada Mortgage and Housing Corporation

by

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EXECUTIVE SUMMARY
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'Population health' has emerged as an influential research and policy thrust in the 1990s, particularly in Canada. Many policy statements on population health assert the importance of housing policy for population health, but little research has been done on the pathways by which inequalities in housing translate into inequalities in health. The research in this report begins that task. It addresses CMHC's research priority area on the role of affordable, appropriate housing in shaping the social and economic health and well-being of Canadians.

The population health perspective is based on a synthesis of a diverse public health and social scientific literature which suggests that the factors that we normally understand as important determinants of human health status are not medical care inputs and health behaviours (like medical care and health behaviours like smoking, diet, exercise), but rather the social and economic characteristics of individuals and populations.

Housing is an important potential contributor to socio-economic inequalities in health for several reasons. Housing and housing markets are significant engines of wealth redistribution. Some people have much more control over their daily living circumstances than others, and housing is an influential factor in creating differences in control that exist in Canadian society. In addition, housing plays a significant role in shaping people's social identity and is important for the expression of social status. It follows that inequalities entrenched in housing and housing markets have the potential to shape inequalities in health. The major question under investigation in this study, therefore, is how could factors related to housing shape socio-economic inequalities in health status?

This issue is investigated in a study of Vancouver's 12 neighbourhood areas (n=650) using a telephone survey, administered in May and June of 1999 to a random sample of Vancouver households. The survey items focused on: socio-demographic characteristics (income, education, etc), dwelling characteristics, household composition, housing-related expenditures and assets, housework, the strain of meeting monthly housing costs, the adequacy of the home as a place of refuge, the home and neighbourhood as a symbol of social status, the experience of neighbourliness, as well as respondents' satisfaction with a number of specific features of their dwelling (space, sunlight, heating, etc.) and their neighbourhood (parks and greenspace, personal safety, etc.). The survey yielded a response rate of 69.3%.

The results of the empirical analysis suggest that there are several factors related to an individual's housing situation that have the capacity to shape their general health status, their health satisfaction, and their mental health status. Notable among these were: total monthly housing expenditure, percentage of monthly income devoted to shelter-related costs, and the capital gains homeowners had accrued. Even stronger were people's housing experiences. Those who reported their housing costs were a strain, their housework was a strain, their home wasn't a place of refuge, their housing tenure was insecure, or that they were dissatisfied with features of their dwelling or neighbourhood, were more likely to report poorer health. The results were strong and consistent with expectations generated by population health research and existing knowledge of the social and economic dimensions of housing inequality.

These results have important practical consequences for public policy efforts at the municipal, provincial, and national levels to reduce social inequalities in health status by improving the housing conditions and lived environments of Canadians. Housing policy should be directed in a manner that would improve housing affordability, stability of tenure and

increase supply, reduce the inequalities between renters and owners, and be designed in a manner that would allow for social networks of mutual support and aid to develop and flourish.

RÉSUMÉ

Logement, inégalité sociale et santé de la population dans les quartiers de Vancouver

Dans les années 1990, « La santé de la population » s'est révélée être une initiative importante en matière de recherche et de politiques, particulièrement au Canada. De nombreux énoncés de politique sur la santé de la population font valoir l'importance de la politique en matière de logement pour la santé de la population, mais peu de recherches ont été entreprises sur les façons dont les inégalités en matière de logement se traduisent en inégalités sur le plan de la santé. C'est la tâche que l'on amorce dans ce rapport. On y aborde le domaine prioritaire de la recherche à la SCHL sur le rôle que joue un logement convenable et abordable dans le profil de la santé sociale et économique et du bien-être des Canadiens.

La perspective de la santé de la population s'appuie sur une synthèse de divers documents scientifiques de nature sociale et sur la santé publique qui suggèrent que les facteurs qui d'habitude sont pour nous des aspects importants de l'état de santé humaine ne sont pas des données de soins médicaux et des comportements de santé, (tels que les soins médicaux et les comportements liés à la santé comme l'usage du tabac, l'alimentation et l'exercice), mais plutôt des caractéristiques sociales et économiques des particuliers et des populations.

Le logement est un élément important pouvant contribuer aux inégalités socio-économiques en matière de santé pour plusieurs raisons. Le logement et les marchés du logement sont des forces

significatives de la redistribution des richesses. Certains ont beaucoup plus de contrôle que d'autres sur les circonstances de leur vie quotidienne et le logement constitue un facteur majeur menant à des écarts dans le contrôle qui existe dans la société canadienne. En outre, le logement joue un rôle significatif dans l'établissement du profil social des gens et il compte beaucoup dans l'expression du statut social. Il s'ensuit que les inégalités inhérentes au logement et aux marchés du logement pourraient éventuellement donner lieu à des inégalités sur le plan de la santé. La grande question ici à l'étude est donc d'établir comment les facteurs liés au logement engendrent des inégalités socio-économiques dans l'état de santé?

Cette question a fait l'objet d'une étude dans 12 quartiers de Vancouver (n=650), réalisée au moyen d'une enquête téléphonique réalisée en mai et juin de 1999, sur un échantillon aléatoire de ménages de Vancouver. L'enquête portait essentiellement sur : les caractéristiques socio-démographiques, (le revenu, l'éducation), les caractéristiques du logement, la composition du ménage, les dépenses et les biens liés au logement, les tâches ménagères, la difficulté de payer les coûts mensuels de logement, le logement considéré comme un endroit de refuge, la maison et le quartier en tant que symbole de statut social, l'expérience de l'appartenance à un quartier, ainsi que la satisfaction du répondant à l'égard d'un certain nombre de caractéristiques spécifiques de son logement (espace, lumière, chauffage) et le quartier (parcs et espaces verts, sécurité personnelle, etc). On a obtenu un taux de réponse de 69,3 % à ce sondage.

D'aprés les résultats de l'analyse empirique, on remarque que plusieurs facteurs liés la situation de logement d'une personne pouvent influer sur son état de santé général, sa satisfaction en matière de santé et son état de santé mentale. Citons parmi les plus importants : les frais mensuels de logement, le pourcentage du revenu mensuel consacré aux coûts liés au logement et les gains en capital accumulés par les propriétaires-occupants. Les expériences des gens en matière de

logement étaient encore plus probants. Ceux qui ont indiqué qu'ils avaient du mal à payer leurs frais de logement, que les tâches ménagères leur pesaient, qu'ils ne considéraient pas leur logement comme un endroit de refuge, que leur mode d'occupation était incertain ou qu'ils étaient mécontents des caractéristiques de leur logement ou de leur quartier, semblaient davantage portés à mentionner une mauvaise santé. Les résultats étaient solides et compatibles avec les attentes générées par la recherche effectuée sur la santé de la population et les connaissances actuelles des dimensions sociales et économiques de l'inégalité engendrée par le logement.

Ces résultats ont de sérieuses conséquences en ce qui a trait à l'application de la politique gouvernementale aux échelons municipal, provincial et national afin de réduire les inégalités sociales dans l'état de santé en améliorant les conditions de logement et les milieux de vie des Canadiens. La politique de logement devrait être menée de façon à améliorer l'abordabilité et la stabilité d'occupation du logement, à accroître l'offre de logements, à réduire les inégalités entre les locataires et les propriétaires et être concue de manière à laisser se développer des réseaux sociaux de soutien et d'aide mutuels.

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CHAPTER 1: INTRODUCTION

The discourse of 'population health' has emerged as a highly influential research and policy thrust in the 1990s, particularly in Canada (Hayes & Dunn, 1998). In terms of policy, population health has prompted social policy reform both at the national (Health Canada, 1996, 1994) (National Forum on Health, 1997) and provincial (British Columbia, 1995, 1994, 1993, 1992; Ontario, 1991) levels. Much of this policy work makes broad, sweeping statements about the importance of housing policy for population health, but little research has been done to trace the pathways by which inequalities in housing translate into inequalities in health. The research in this report begins that task. It draws upon and contributes to population health research, and housing and health research, and opens up significant potential for further inquiry in CMHC's research priority area of housing affordability, particularly the role of affordable, appropriate housing in shaping the social and economic health and well-being of Canadians.

This research project investigates links between housing, social inequality, and population health in 12 Vancouver neighbourhood areas. Specifically, the research is concerned with the influence of three interrelated factors upon health at the individual level:

- the operation of housing and housing markets in the shaping of inequalities between individuals and households,
- the influence of housing in the distribution of control over individuals' life circumstances, and
- the ways in which housing and location differentially shape social identity and confer social status.

The importance of these objectives is twofold. First, if the evidence shows a relationship between relevant dimensions of housing and measures of population health, this lends

considerable support to the claim that housing must be a central component in the design of healthy public policy aimed at reducing inequalities in health status. Reducing health inequalities and implementing healthy public policy have been identified by the Canadian government as national health challenges (Epp, 1986), and by the B.C. government in the recently adopted 'Health Goals' (British Columbia, 1995). Secondly, this research makes a contribution to housing and health research. To date the field has been virtually silent on the intersection of socio-economic inequalities in health and the importance of housing upon the distribution of social resources, despite evidence that housing is a principal source of social inequality in industrialized countries (Badcock, 1984).

The results of this study suggest that inequalities in housing are indeed associated with inequalities in health. It was hypothesized that both material (housing costs, dwelling conditions, neighbourhood conditions) and meaningful (home as a refuge, home as an expression of self-identity, home as a status symbol) dimensions of housing would be important to health, and the research findings confirm this. The results have important practical consequences for public policy efforts at the municipal, provincial, and national levels to reduce social inequalities in health status by improving the housing conditions and lived environments of Canadians. In addition to policy makers in planning departments, public health departments, housing ministries, and health ministries, the results are of interest to housing researchers, population health researchers, housing-related non-profit and non-governmental organizations, and social justice organizations. It is widely claimed that interventions by policy sectors outside health ministries and departments have the capacity to influence population health the most. The findings of this research, suggest that housing policy should be an important arena for health policy reform.

CHAPTER 2: BACKGROUND AND RATIONALE

There are three important areas of past research that apply to this study, and these are addressed in this chapter. First, the chapter includes a description of the population health perspective and reveals some of the reasons why the study of housing would be a valuable addition to population health. Second, is a brief description of selected components of the body of research on housing inequality. Some of the most important themes in research on housing inequality have strong similarities to the commonly described factors underlying health inequalities. Finally, there is a brief description of existing housing and health research. This is relevant because one would intuitively think that this body of work could inform the present study. It is notable, however, because of its near-complete silence on issues of the role of housing in the production of socio-economic inequalities in health.

2.1 Population Health

The discourse of 'population health' has emerged as a highly influential research and policy thrust in the 1990s, particularly in Canada (Hayes & Dunn, 1998). In terms of policy, population health has prompted social policy reform both at the national (Health Canada 1996, 1994)(National Forum on Health, 1997) and provincial (e.g. British Columbia 1995, 1994, 1993, 1992; Ontario 1991) levels. The population health perspective is based on a synthesis of a diverse public health and social scientific literature which suggests that the most important antecedents of human health status are *not* medical care inputs and health behaviours (smoking, diet, exercise, etc.), but rather social and economic characteristics of individuals and populations (Evans, Barer, & Marmor, 1994; Frank, 1995; Hayes & Dunn, 1998). Studies repeatedly demonstrate a positive association between social status and health status, however

measured. Life expectancy, for instance, increases with socioeconomic status in nearly all developed countries (Hertzman & Wiens, 1996). The pattern is not, however, typically a simple difference between the wealthy and the poor, instead it is almost invariably "a monotonic 'gradient', wherein successive population quantiles, graded according to increasing levels of income or education, or by occupational class, enjoy increasingly long and disability-free lives" (Hertzman & Wiens, 1996, p.1084).

There remain, however, many unanswered questions about the important elements of these environments for health, and the mechanisms through which they might shape the health status of individuals and populations (Hayes & Dunn, 1998; Kaplan & W., 1997; Lynch & Kaplan, 1997; Macintyre, 1997; Syme, 1994). Some compelling recurrent themes emerge when reading contemporary population health research—themes which suggest that the amount of control people exercise over their daily lives, how demanding their lives are on a day-to-day basis, and the degree to which they feel and experience a sense of status, dignity and even pride in themselves are important factors contributing to their well-being. These things tend to vary by social class, with people of relatively lower social class experiencing less control, more demand and more indignity in their day-to-day life. These are believed to translate into differences in chronic stress, ultimately manifesting in actual health outcomes through processes of 'biological embedding' (Hertzman, 1994). One of the things that can redress differences in control and demand in people's everyday environments are the availability of resources to cope with stressors. The differential distribution of health status by socio-economic status, therefore can be seen as significantly influenced by the quality of housing and neighbourhood conditions in which people live, and their relative proximity to opportunities, services, and resources (Kaplan, 1996).

As Macintyre (1997) puts it, future research on social inequalities in health needs to ask, "what are the precise mechanisms or pathways by which social inequalities in health are generated and maintained in particular contexts?" (p.740). Similarly, Kaplan and Lynch ask

> [H]ow does ordinary life differ among groups in which basic material needs are met, but that differ by income level? And how do these differences in the texture of everyday life translate into socioeconomic inequalities in health? (Kaplan & W., 1997, p.1411).

The texture of ordinary, everyday life, is situated, geographically differentiated, and centred principally, although to different extents for different people, in the home (Pratt, 1982). Past research on housing and health has not significantly addressed this dimension of housing for its potential influence upon health status, despite the considerable body of work in housing research on inequalities that are generated by housing markets and differences in housing status and quality.

2.2 Housing and Social Inequality

While labour markets are perhaps the principal source of inequality in capitalist societies, it is well-established in urban social geography that housing and housing markets are influential upon the differential distribution of wealth and control in society, and play a significant role in shaping social identities and conferring social status (Badcock, 1984; Cater & Jones, 1989; Duncan, 1981; Harvey, 1973; Pratt, 1982). One reason for the potential importance of inequalities entrenched in land and housing markets for population health follows from the unequal distribution of control over living conditions that results from the housing market. A location in the landscape, a place to base one's activities and existence, in turn, is one

of the important functions which housing serves in the lives of individuals and households. But at another level, the distribution of housing wealth leaves an indelible imprint on the social geography of the city, conferring locational advantages and disadvantages upon households in a way that systematically disadvantages households of lower socio-economic status. Additionally, beyond the distribution of material "goods and bads", housing is also a meaningful social phenomenon, so that where you live (the dwelling ***and*** its socio-spatial context) are influential in shaping individuals' and households' social status and identity.

Despite such apparent connections, little research has been undertaken on the potential human health impacts of inequalities generated by housing and housing markets, and inequalities in housing affordability. Given the centrality of housing to our everyday lives and its importance as a form of material wealth, it is remarkable that the population health perspective has largely ignored the role of housing in shaping health status, and the role of land markets in processes of social stratification. Research on the relationship between health and housing has also tended to overlook key aspects of its function in shaping identity, distributing wealth, and providing access to goods, services, work, and recreation. This research project, therefore, fills crucial gaps in population health research, housing and health research, and housing research more generally.

2.3 Housing and Health: Past Research

Recent research on housing and health has been concentrated in three main areas. The first such area consists of investigations of a 'health selection' hypothesis. Specifically, this work has investigated "whether housing provision is health selective" and if this phenomenon can account for "the differential distribution of 'sick' and 'well' people across the housing

stock" (Smith, 1990, p. 753). In the United Kingdom, there are public housing programs directed at people of 'medical priority' (Bickler, 1988), although evidence on the health consequences of re-housing is mixed. Generally, those re-housed on mental health grounds improve, but the evidence on persons with physical health conditions is equivocal (Smith, 1990). A second common concern of researchers is with health status and access to health care amongst homeless persons (Brickner & et al., 1990). Clinical, disease-focused concerns predominate here, evidenced by work on homelessness and AIDS (Raba et al., 1990), tuberculosis (McAdam et al., 1990), hypertension (Piantieri, Vicic, Byrd, Brammer, & Michael, 1990), and health services provision (Somers, 1990), for example. While undoubtedly altruistic, this work has the potential to insulate the factors responsible for homelessness from critical analysis, and by default, links between housing (or lack thereof) and health become a project concerned only with the marginal population of homeless persons.

The final area of existing research consists of investigations of the 'pathological' consequences of housing upon health. This area can further be divided to account for emphases on both mental and physical health outcomes. Investigations of the former are typically concerned with links between crowding (Gabe & Williams, 1993; Gove, Hughes, & Galle, 1979) or high-rise housing (Freeman, 1993; Gillis, 1977) and mental health. Investigations of housing conditions and physical health outcomes include studies of links between dampness and mould on the one hand and respiratory disease on the other (Hunt, 1993; Hyndman, 1990; Strachan, 1993); pest infestation and health (Howard, 1993); and cold and heat related illnesses (Collins, 1993). This work, particularly the research on physical health outcomes, has been primarily a British enterprise. In North America, a relatively new housing stock—also the product of improved building standards—has generally meant fewer concerns about such

pathological threats to health from housing, but as the stock ages in North America, this may be of greater importance.

2.4 Research Objectives

The two major objectives of this study are as follows:

Objective 1: to investigate ways in which housing and home contribute to the social production of health for individuals and,

Objective 2: to investigate ways in which housing and people's homes could act as a locus for the production of social inequalities in health status.

The major question under investigation, therefore, is in what ways could factors related to housing, in conjunction with other dimensions of the social environment, operate over the duration of peoples' lives to produce systematic inequalities in health status across social strata?

The importance of these objectives is twofold. First, because of its hypothesized influence upon social status, control over life circumstances, and social identity through several interdependent mechanisms, housing could be a central component in the design of healthy public policy aimed at reducing inequalities in health status. Reducing health inequalities and implementing healthy public policy have been identified by the Canadian government as national health challenges (Epp, 1986) and by the B.C. government in the recently adopted 'Health Goals' (British Columbia, 1995). Secondly, this research will make a contribution to research on the spatiality of health. Population health research has been criticized for its abstraction from the lived contexts of individuals and populations (Hayes, 1998, 1994) , while housing and health research has been virtually silent on the intersection of socio-economic inequalities in health and the importance of housing upon the distribution of social resources

(Hwang et al., 1999), despite evidence that housing is a principal source of social inequality in industrialized countries (Badcock, 1984).

In this study, these broad objectives are translated into a study methodology using the analytical framework in Figure 1, adapted from Dunn and Hayes (Dunn & Hayes, 2000). Using the framework, which is based on existing knowledge of the social determinants of health and the similarities these determinants have with the important social and material dimensions of housing revealed by past housing research, it is possible to enumerate a number of research hypotheses concerning links between various dimensions of housing and health status measures (Dunn, 2000). These determinants, as revealed in Figure 1, are described below.

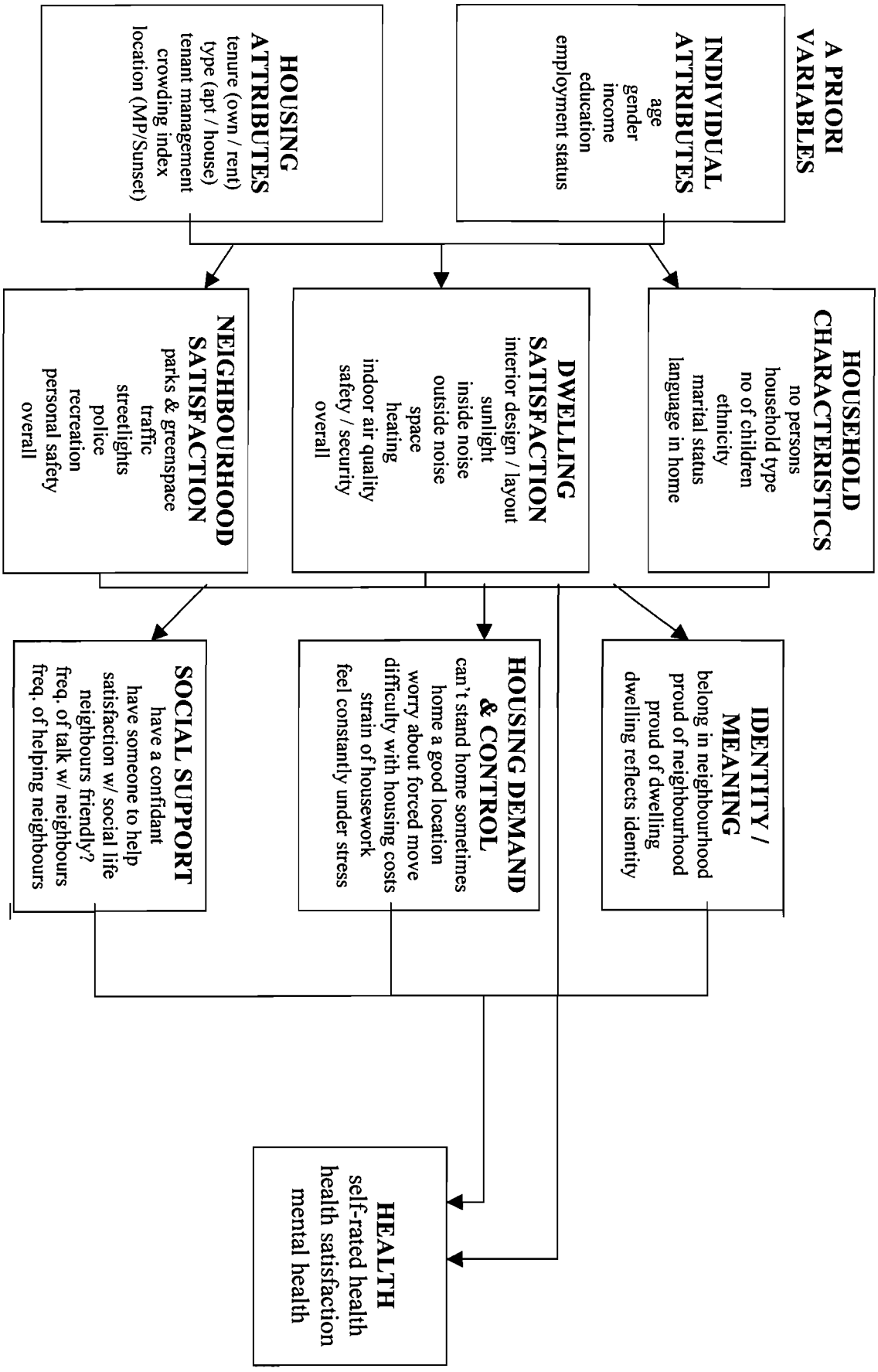
Individual Attributes

Beginning at the left side of Figure 1 with the box named 'individual attributes', it would be expected that individuals who were older, lived in lower income households, were less educated and were un- or under-employed would be more likely to experience poorer health status. These relationships are well-established in the research literature (Evans et al., 1994). Past studies on gender differences in health status have shown that the effect of gender on health is highly dependent upon the measure used—men die younger but women are sick more often (Macintyre, Hunt, & Sweeting, 1996; Matthews, Manor, & Power, 1999).

Housing Attributes

Within the next box, 'housing attributes', those who rent their home as opposed to renting, who live in an apartment, who do not have some form of tenant management (where relevant, i.e., strata councils, co-ops, etc.), and who are more crowded (as measured by

FIGURE 1: ANALYTICAL MODEL FOR HOUSING AND HEALTH REGRESSION ANALYSIS



bedrooms per person) could be expected to report poorer health status. Of these, the expectation is that housing tenure and tenant management are likely to make the most difference because of their role in providing control over one's domestic circumstances. There is some evidence that home ownership is associated with better health as well (Macintyre, Ellaway, Der, Ford, & Hunt, 1998).

Household Characteristics

In the second column of boxes, there is no strong reason to believe that a larger or smaller household may be inherently better for health, although a crowded household may not be good for health, and if living alone means someone is socially isolated, that has been shown to be bad for one's health (House, Landis, & Umberson, 1988). The same logic applies for household type and marital status—although it is unlikely that any household type or marital status is *inherently* better for health, being married or in supportive relationships within a household could improve social support and therefore health. In terms of ethnicity and language, the health effects of these variables can logically work in either direction as well. There is evidence of a 'healthy immigrant effect' in past studies, but immigrants and people who do not speak English well may also experience health effects as a result of discrimination and isolation (Dunn & Dyck, in press).

Satisfaction with Dwelling and Neighbourhood

The next two boxes concern satisfaction with various features of one's dwelling and with one's neighbourhood. The list of specific features has been generated to be applicable to most potential respondents, although clearly the things listed may not be important to all. It is

hypothesized that greater satisfaction with specific features of one's dwelling / neighbourhood and greater overall satisfaction will be associated with better health. This section assumes the importance of the experience of one's housing, not simply the absolute characteristics.

Meaning / Identity and Housing

In the first box in the third column, the inclusion of 'identity / meaning' is meant to signal the importance of housing as a site for the investment of meaning. Recent research in population health has suggested that not only are the direct effects of people's material conditions an important factor in the production of health inequalities, but also important are "the social meanings attached to those material conditions and how people feel about their circumstances and about themselves" (Wilkinson, 1994, p.70). Housing obviously has physical or material elements, which would be expected to be influential upon health—proper warmth, ventilation, etc., are important for normal biological functioning—and these factors are represented in the dwelling satisfaction questions. But beyond this, housing is an important symbol of the self (Marcus, 1995) and an expression of status and pride (Csikszentmihalyi & Rochberg-Halton, 1981). These are reflected in the dimensions listed in the 'identity / meaning' box in the model. It is hypothesized that those who report that they feel like they belong in their neighbourhood, are proud of their neighbourhood, are proud of their dwelling and feel their dwelling is a reflection of their identity will be more likely to report better health.

Housing Demand and Control

The logic for the inclusion of the 'housing demand and control' box is based on existing knowledge of the health effects of workplace organization. Numerous studies have shown that

the more demanding one's job is, the less control they exercise over how they do their work and the less social support they receive from co-workers, the greater the health risk (Karasek & Theorell, 1990). If this is the case, presumably similar concepts apply to the other 16 hours of the day, which would be centred in the home.

A focus on the demand / control properties of the home is also consistent with the population health perspective, as it highlights the importance of routine experiences of everyday life in shaping health outcomes across the social hierarchy. The population health perspective suggests that the cumulative impact of multiple, overlapping stressors, when multiplied across the life course of the average individual, has the capacity to shape individual health status and create large socio-economic differences in population health. Housing plays a central role in routinized, everyday life and is fundamentally bound up in one's sense of control over life circumstances (Dunn, 2000; Saunders, 1984). The multiple, overlapping inequalities that follow from one's position in the housing market are argued to be second in magnitude only to inequalities generated in the realm of work (Badcock, 1984; Cater & Jones, 1989). Yet a recent literature review (Hwang et al., 1999) revealed that little has been written on the influence of inequalities generated by housing and housing markets on the differential distribution of health status (recent exceptions include Macintyre et al., 1998; Nettleton & Burrows, 1998).

It is hypothesized that greater control and less demand in the domestic sphere will translate into better health status in empirical studies. Several specific items have been developed representing some of the most common and theoretically important dimensions of demand and control in the home. People who say they 'can't stand to be at home sometimes', 'worry about being forced to move' and 'have difficulty with monthly housing costs' are hypothesized to have less control and therefore their health will be at greater risk. Similarly,

those who find housework a strain, who don't feel like their 'home is a good location to live their life' and who 'feel constantly under stress' are hypothesized to experience greater demand and greater health risk.

Social Support

Social support is commonly recognized as a crucial mediator of the wide range of stressors, and this is reflected in Figure 1 (House et al., 1988). Not only is the quantity of social support important from a health perspective (i.e., number of close friends and/or relatives), so too is the quality of social support (i.e., satisfaction with social relationships) and the existence of specific kinds of social supports (i.e., someone to confide in, someone that can help you if you need it). It is hypothesized that the greater the quantity and quality of social support, the better a person's health will be. Also included in this box are items concerning neighbourliness—positive, supportive relationships with one's neighbours can be a real health asset, while acrimonious or tense relationships can be a source of strain. It is hypothesized that the lack of strong neighbourly ties may not have any effect on health, as these potential sources of support could be obtained outside the local neighbourhood. It would be reasonable to expect, however, that acrimonious relationships with one's neighbours would not be good for health.

Summary

The empirical analysis in the following chapters investigates relationships between socioeconomic status, material and meaningful dimensions of housing and home, and health status and is guided by the analytical model appearing as Figure 1. The goal of the empirical analysis is to investigate ways in which material and meaningful factors related to housing, in

conjunction with other dimensions of the social environment, could operate to produce systematic inequalities in health status across social strata.

CHAPTER 3: STUDY DESIGN AND METHODS

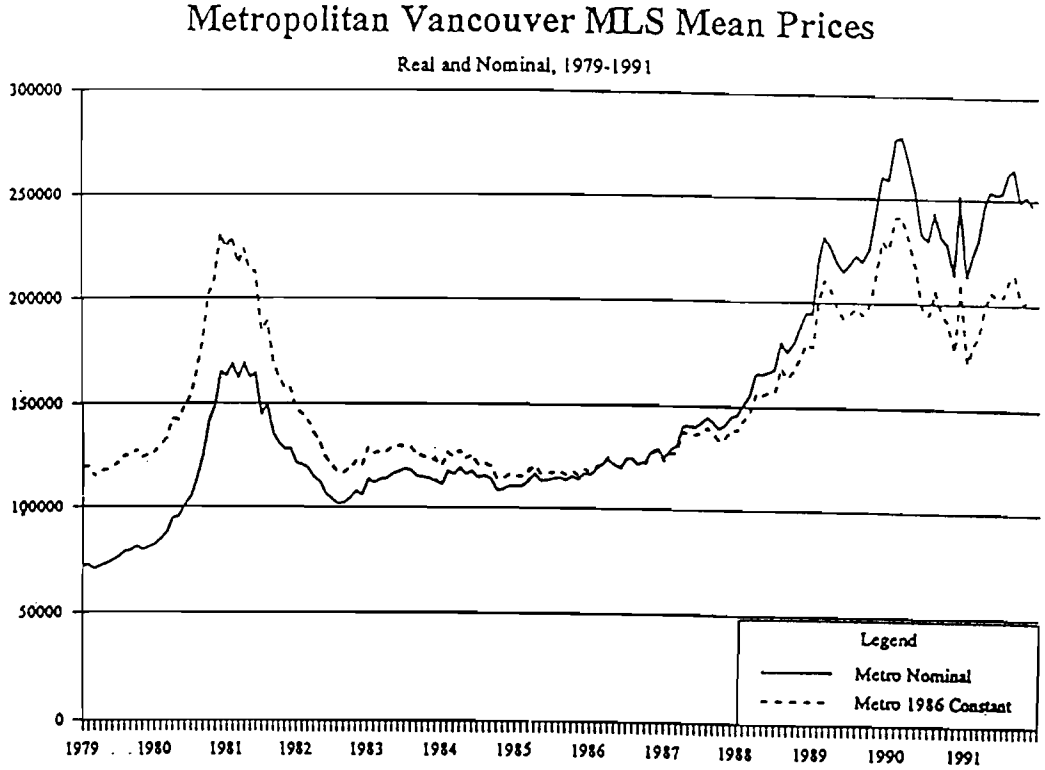
The data for the present study were obtained through a telephone survey of households in the City of Vancouver, Canada (n=650). The following sections describe the data collection methods and rationale, before moving on to a presentation of the results in Chapter 4.

3.1 Site Selection and Boundaries

The housing market in Vancouver has been highly active in the past 25 years, characterized by rapidly rising house prices and rental rates and a consistently low rental vacancy rate. Figure 3.1 shows the trend in mean house prices from 1979, expressed both in real (1986 constant dollars) and nominal terms, while Table 3.1 shows mean values for various housing attributes (price, lot size, floor area, etc.) and the percentage change in those characteristics between 1981 and 1991. These figures paint a clear picture of declining value for money: slightly more house but for much more money—with mean prices escalating substantially from $151,308 in 1986 to $235,316 in 1991 (a 55.5% increase). During that time, the mean for most housing attributes remained stable. Mean lot sizes declined by 2.9%; mean floor area increased by 1.7%; mean number of bedrooms increased by 0.9%; and mean number of bathrooms increased by 5.6%.

Rental housing trends also indicate a relatively tight housing market. Figure 3.2 shows that apartment vacancy rates were very low from 1980 to 1993, ranging between 0% and nearly 3%. Figure 3.3 shows the same trend for all major Canadian metropolitan areas for the period 1986-1992, and Vancouver's vacancy rate is well below all other Canadian metropolitan areas for this period (except Toronto) and also below the national average.

Figure 3.1



Source: Heikkila and Hamilton (1996)

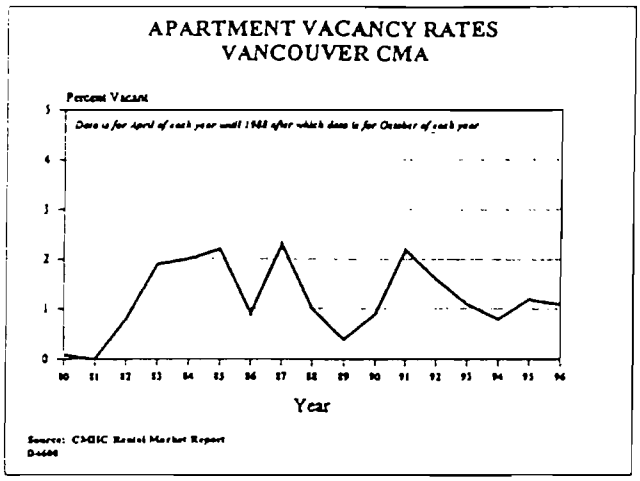
Table 3.1

Mean Values for Housing Attributes, 1981 & 1991

Housing Attribute	Mean Value 1981	Mean Value 1991	% Change
Sales Price	$151,308	$235,316	55.5%
Lot Size (sq. ft.)	8479	8237	-2.9%
Floor Area (sq. ft.)	1218	1236	1.7%
Age	19.4	26.9	38.0%
Bedrooms	3.41	3.44	0.9%
Bathrooms	1.62	1.70	5.6%

Source: Heikkila and Hamilton (1996)

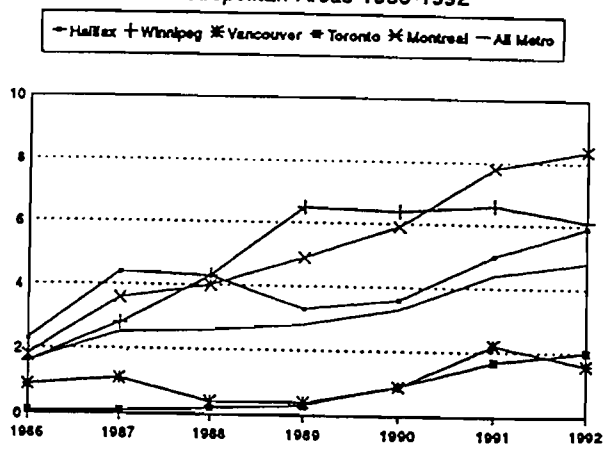
Figure 3.2



Source: City of Vancouver (1996)

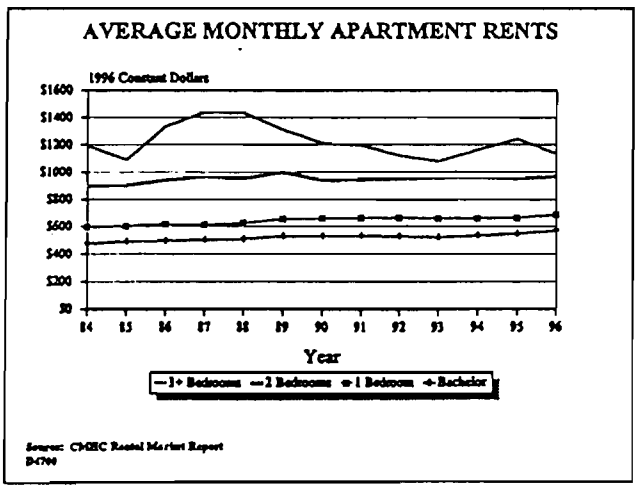
Figure 3.3

Apartment Vacancy Rates: Selected Metropolitan Centres and All Metropolitan Areas 1986-1992



Source: CMHC Vacancy Rate Survey

Figure 3.4



Source: City of Vancouver (1996)

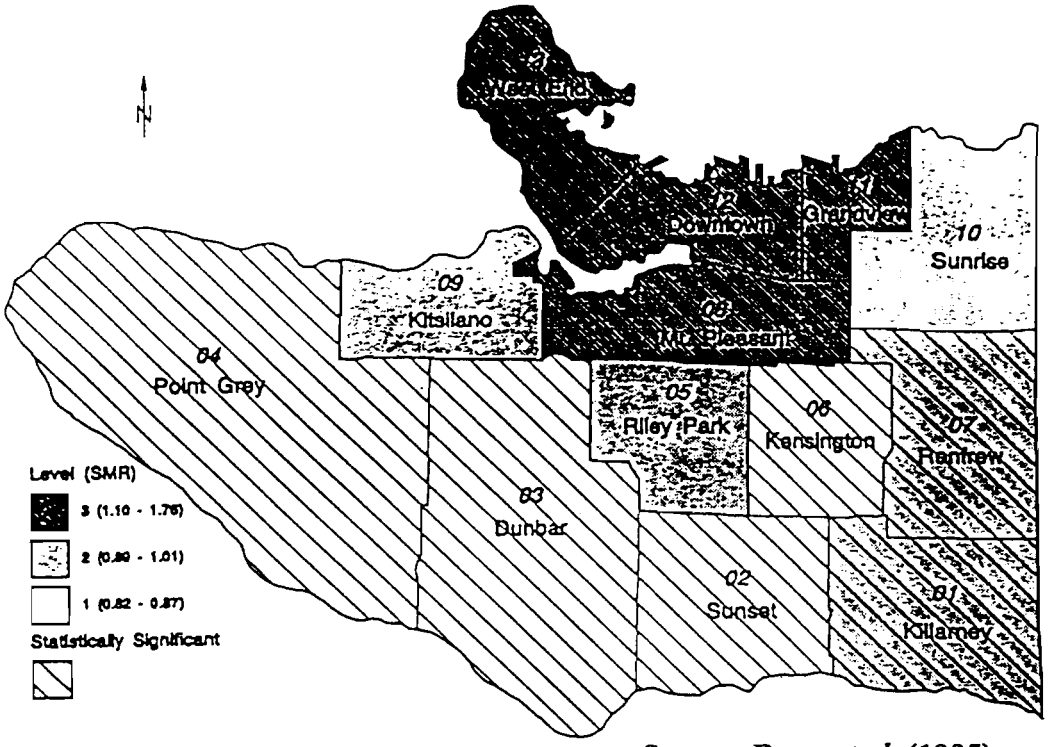
Despite the short supply, however, rental prices have remained relatively stable, in constant dollar terms. Figure 3.4 shows the trend of average rents for bachelor, one-bedroom, and two-bedroom apartments in Vancouver between 1984 and 1993 (in 1993 constant dollars). Average rents have remained relatively stable over this period, particularly for bachelor (around $460.00) and one-bedroom apartments (around $600.00). Two bedroom apartments have shown over a $100.00 variation during this time, ranging from about $850.00 to just under $1,000.00. Compared to national standards, these average rents are relatively high (CMHC 1994).

The analysis in this research project assumes the importance of neighbourhood social and economic environments for health status, so data collection was organized in a way that ensured a relatively balanced sample selection across the city by neighbourhood area. Selection of neighbourhood boundaries was based on a mortality atlas of Vancouver published in 1995 (Burr, Costanzo, Hayes, McNab, & McKee, 1995). The atlas provides a descriptive analysis of variations in standardized mortality rates and selected health status indicators among 13 Vancouver neighbourhood areas. It is based on neighbourhood boundaries that coincide with census tract agglomerations, and which loosely correspond to neighbourhood area boundaries used by the City Planning Department for planning purposes. Figure 3.5 shows standardized mortality rates (SMRs) for neighbourhood areas in the City of Vancouver for the period 1990-1992. The darkly shaded neighbourhoods have relatively high SMRs, the lightly shaded neighbourhoods have moderate SMRs, and the unshaded areas have relatively low SMRs. Areas with diagonal hatching had statistically significant rates. Table 3.2 shows the information from the map in tabular form, with neighbourhoods with the highest SMRs listed at the top.

Figure 3.5

Map of All Cause Mortality in Vancouver Neighbourhoods

1990 - 1992



Source: Burr, *et al.* (1995)

Note: SMR - Standardized Mortality Ratio.
Data excludes deaths occurring in major and long term care hospitals.
Maps prepared by the Division of Vital Statistics (05/95), based on boundaries supplied by BC STATS.

Table 3.2

Mortality Rates and Social Characteristics, Vancouver Neighbourhoods 1990-1992

Study Area	All Cause SMR	Average Family Income	Lone Parent Families	Unemployment Rate	Rented Private Dwellings	Less than Grade 9 Education	With University Degree
03 - Dunbar	0.82	1	1	1	2	1	1
04 - Point Grey	0.83	1	1	1	1	1	1
06 - Kensington	0.86	3	2	3	2	3	3
02 - Sunset	0.87	2	1	2	1	3	2
01 - Killarney	0.89	2	2	2	2	2	2
07 - Renfrew	0.90	2	2	2	1	2	3
09 - Kitsilano	0.93	1	2	1	2	1	1
10 - Sunrise	0.94	3	2	2	1	3	3
05 - Riley Park	1.01	2	3	1	2	2	2
13 - West End	1.10	1	1	2	3	1	2
08 - Mt Pleasant	1.22	2	3	3	3	2	1
11 - Grandview	1.39	3	3	3	3	2	2
12 - Downtown	1.76	3	3	3	3	3	3

Note: The value of 1, 2, or 3 corresponds to the 4 "best", 5 middle, and 4 "worst" scores on each characteristic for each area.

In the present study, the number of neighbourhoods used was reduced from 13 to 12 after the interviews had taken place, to ensure a satisfactory sample size in each neighbourhood. The boundaries were re-drawn by adding census tracts to some neighbourhoods and subtracting from others. A map of the new census tract boundaries employed in this study, along with the sample size for each neighbourhood appears as Figure 3.6. In addition to the neighbourhood-area distinction, some of the analyses in the following pages use a crude division between the 'eastside' and the 'westside' of the city. This distinction conforms to a historical pattern of lower socio-economic status, poorer housing quality, more affordable housing, greater presence of immigrant groups, etc., in the eastside of Vancouver than on the westside.

A superficial picture of housing trends on the eastside of Vancouver can be inferred from Figures 3.7 and 3.8. Median prices for single-family homes (Figure 3.7) of all types have risen steadily in East Vancouver since late 1982, and depending on size of house, ranged between $200,000 and $450,000 by 1993 (in 1993 constant dollars). The condominium market (Figure 3.8) has shown more volatility since the time for which data are first available, in 1984. On the whole, however, an upward trend is shown in all categories of condominiums, with median price ranging between roughly $75,000 and $225,000 by 1993 (in 1993 constant dollars). In short, East Vancouver, although exhibiting lower prices than most of the western portion of the city, has shown the same general upward trend in housing costs.

3.2 Survey Instrument

The survey administered to the sampled Vancouver households documents the self-reported health status (mental, physical and overall) of respondents, and collects information on

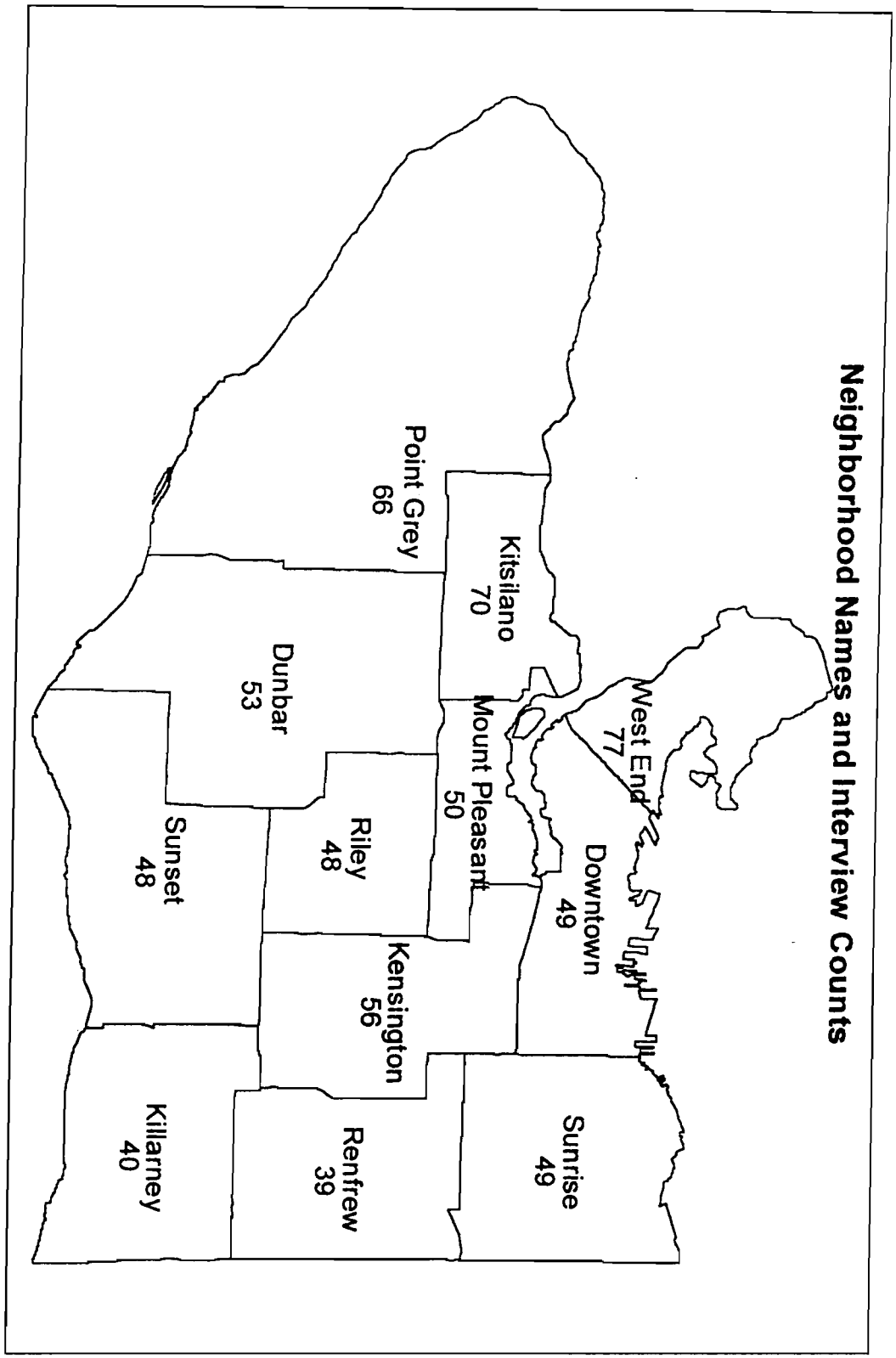
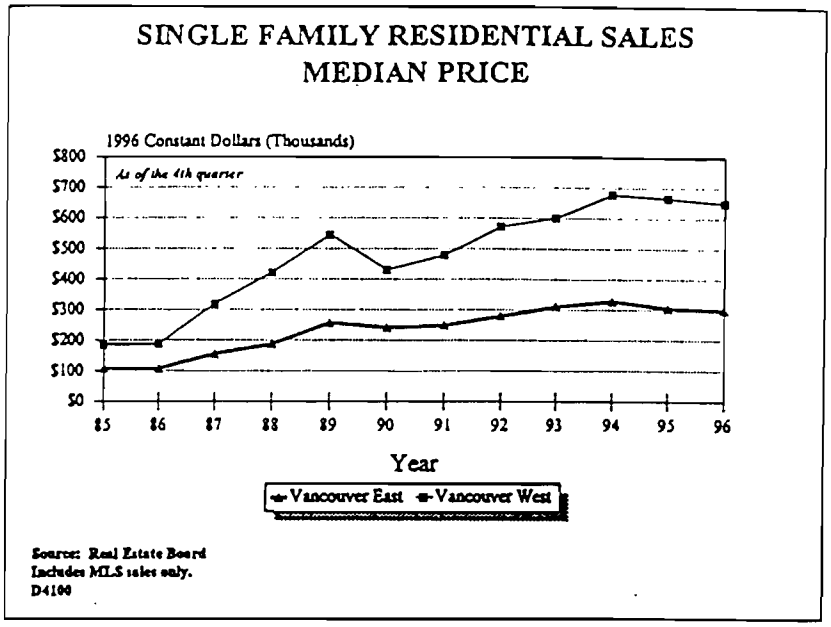

Neighborhood Names and Interview Counts
Point Grey
66
Kitsilano
70
Dunbar
53
Sunset
48
Riley
48
Mount Pleasant
50
West End
77
Downtown
49
Kensington
56
Killarney
40
Renfrew
39
Sunrise
49

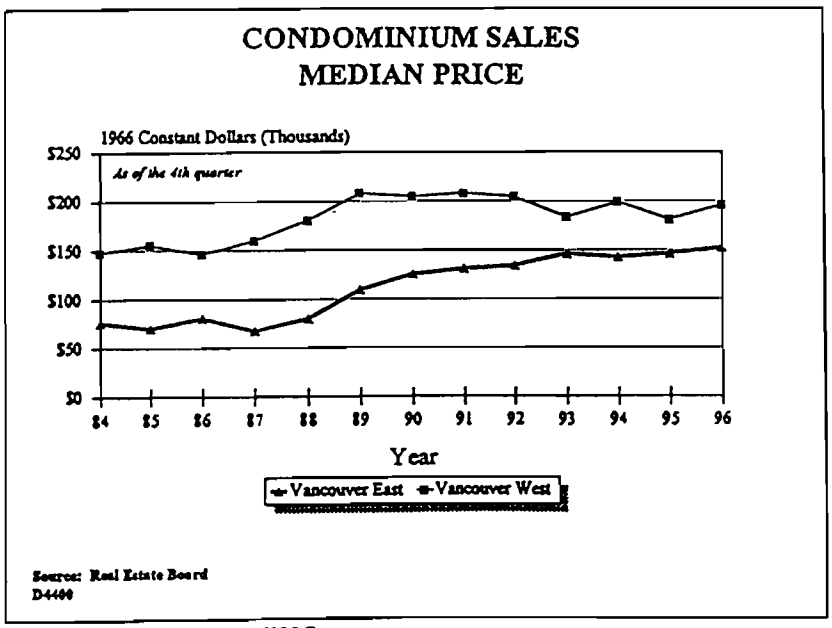
Figure 3.6

Figure 3.7



Source: City of Vancouver (1996)

Figure 3.8



Source: City of Vancouver (1996)

a wide range of variables related to housing (e.g., type, tenure, meaning, satisfaction, affordability), neighbourhood perceptions (e.g., amenities, crime, neighbourliness, area reputation, etc.), social support (e.g., quality and quantity), occupation, education, and income for statistical analysis. The objective of this analysis was to investigate whether factors related to individuals' housing (i.e., affordability, type, tenure, meaning, satisfaction with dwelling and neighbourhood), in conjunction with factors typically identified within the population health perspective (i.e., social support, income) contributed to their health status.

The survey instrument employed in this research appears in Appendix A. The questionnaire was introduced as 'a study of housing and quality of life in Vancouver neighbourhoods'. Respondents were first asked to provide their postal code so that the neighbourhood in which they lived could be determined. In the statistical analysis of housing, socioeconomic status and health relationships that follow, tests were conducted to look for a significant independent effect of neighbourhood in the production of health status. For each household that responded to the survey, an eligible respondent within the household was selected randomly, adding a second layer of randomization to the random selection described in the survey administration section below.

Questions 2-11: Socio-demographics, dwelling, and household characteristics

The substantive portion of the questionnaire began by asking the selected respondent within each household some basic questions about the nature of their dwelling. Specifically, they were asked what type of dwelling they lived in (Q.2), whether they owned or rented their dwelling (Q.3), if their dwelling was part of a strata corporation (Q.4), and if their dwelling was part of a housing cooperative (Q.5). In question 6, the focus shifts back to the physical

dimensions of the dwelling, as respondents are asked to indicate how many bedrooms their dwelling has and when it was built (Q.7). Next, respondents are asked how long they have lived in their dwelling (Q.8), how long they have lived in their neighbourhood (self-defined) (Q.9), how many people normally live in their household (Q.10), and the type of household the occupants of their dwelling can be classified as (Q.11). Questions on the type and tenure of respondents' housing were of particular interest in this investigation. They were included to ascertain if any variations in health status could be attributable to differences in housing tenure. Home ownership could imply an increased sense of control, prestige, etc.; offer the opportunity for wealth generation through speculation (see Despres, 1991; Williams, 1987); and place people in an advantageous position in power relationships, especially authority and command relations (Scott, 1996) as illustrated by the common example of wealthier neighbourhoods having more success in opposing the location of noxious land uses in their neighbourhoods (Baxter, 1997; Dear & Taylor, 1982). With regards to the question on co-operative and strata council housing, there is some evidence of enhanced liveability of cooperative dwellings, especially among marginalized groups (e.g., lower-income people, women) (Werkele, 1988). These are often attributed to tenant control of management of facility (e.g., increased control - this is also the case for condominium management) and, related to this, increased opportunities for positive informal support networks to develop.

Questions 12-20: Dwelling and Neighbourhood Satisfaction

Questions 12-20 asked respondents to rate their level of satisfaction with various dwelling attributes and amenities, as well as their overall satisfaction with their dwelling. Questions 21-26 asked respondents to rate their satisfaction with various amenities and

attributes of their neighbourhood, and to rate their overall level of satisfaction with their neighbourhood. The relationship between neighbourhood satisfaction and health status is suggested by Sooman and Macintyre's (1995) finding that Glasgow residents' social status and perceptions of their local area were independently related to health differences between neighbourhoods (see also Tulle-Winton, 1997). All dwelling satisfaction and neighbourhood satisfaction items were drawn from Ekos & Associates (1990).

Questions 27-34: Identity, Status, Meaning and Control in the Home

Questions 27-34 concern the ways in which dimensions of social identity, social status, and demand and control manifest in the domestic sphere. These questions were composed by the investigator, based on analogues from the workplace questions in the National Population Health Survey (1994-1995) and theoretical constructs from housing research and the population health perspective. Question 28 sought to tap issues of belonging, and so featured the mechanisms of identity and status. The degree to which respondents felt pride in their neighbourhood (or lack of shame Q. 29) would be expected to relate to identity and status and may be associated with health status. Pride in dwelling (or lack of shame Q. 30) would relate to the same mechanisms, and relies on the same logic, but at a different scale. Question 31 was included to detect feelings of entrapment, or lack of control that may be manifested in the housing / neighbourhood environment for survey respondents.

The following question (Q. 32) asked respondents to indicate the extent to which they agreed that their home provides a good location for them to live their life. It sought to tap the 'workability' of the residential location for the respondent, in the sense of the extent to which their dwelling provided them with access to the resources they need to live their lives

satisfactorily. The question concerns issues of control primarily. Question 33 asked respondents to indicate the extent to which they agreed that they often worry about being forced to move out of their current home, and sought to detect feelings of lack of control as they may be manifest in the security of tenure in the dwelling. Finally question 34 asked respondents to assess the extent to which they thought their home is a reflection of who they are. This question clearly concerns identity as it is embedded in one's home, as expressed, for instance, in the notion that the home is a mirror of the self (Marcus, 1995), as well as a surface for the inscription of one's self-identity (Despres, 1991).

The validity of the questions in this section has not been empirically evaluated. The argument for their validity is based on their coherence with other empirical findings in the area of workplace organization and health (Karasek & Theorell, 1990), and meaning of home research (Despres, 1991). These questions were created by combining the logic of the demand / control / social support model of workplace health and notions of identity, status, and control as they are embedded in the domestic milieu. Rating of their appropriateness by a panel of housing experts could have been used to establish content validity (Streiner, Norman, & Munroe-Blum, 1989), had resources for such an exercise been available.

Questions 35-37: Neighbourliness and Neighbourhood-based SocialTties

The next several questions (Q. 35-37, pages 5-6) concerned neighbourliness and neighbourhood-based social ties. The first asked for individuals' assessment of the friendliness of the people in their neighbourhood, while questions 36 and 37, which concern the frequency with which respondents talk with their neighbours (Q. 36) and the frequency with which they exchange help with their neighbours (Q. 37), sought to detect people's neighbourhood-based

social ties and support. Questions very similar to these are commonly used in population surveys, and the immediate source of these questions was Elliott (Elliott, 1992) and Dunn (Dunn, 1993).

Questions 38-41: Quantity and Strain of Housework

Questions 38-41 concern domestic labour and were included to assess the importance of domestic work on respondents' overall stress burden, as well as the influence of domestic labour strain on health and well-being. These questions were important for their relevance to gender differences in health-related stress. One of the important concerns addressed in studies of gendered geographies has been the impact of women's widespread labour force participation on domestic social relations. Often women are shown to do 'double-duty' (Michelson, 1988). In other research, health impacts of double-duty amongst a sample of Swedish women (n=12,772) were shown by Hall (Hall, 1992). Questions chosen for this section were drawn from the West of Scotland Twenty-07 Study of Health in the Community (Medical Research Council, 1992). These questions represent an attempt to capture the magnitude and impact (in terms of strain) of housework and care for a small child upon respondents.

Questions 42-44: Health Outcome Questions

The next few questions (42-44) are specifically about health-related issues and are the major outcome variables for this study. Self-rated health status is a widely used measure across the world (Van Doorslaer, Wagstaff, Bleichrodt, & et al., 1997) that has been shown to be highly correlated with other 'harder', objective, and physical measures of health (mortality, diagnosed morbidity, symptom reporting) (Hoeymans, Feskens, Kromhout, & Van Den Bos,

1997; Miilunpalo, Vuori, Oja, Pasanen, & Urponen, 1997), and also functional status (Gold, Franks, & Erickson, 1996). Health satisfaction taps a similar construct as self-rated health and adds an important contextual feature to understanding self-rated health. The two next questions (Q. 44 and 45) concern mental health and well-being. Both were drawn from the Rand Mental Health Inventory or MHI (Ware, Johnston, Davies-Avery, & et al., 1979). The first is a valid and robust indicator of the likelihood that a person suffers from clinically-diagnosable depression or anxiety, while the second (Q. 45) was selected as a stand-alone measure because of its theoretical relevance to this research. The MHI measures mental health in terms of psychological distress and well-being, focusing on affective states, and was developed for use in population surveys (McDowell & Newell, 1996). For each of these two questions, respondents were asked how much of the time, over the past two weeks, have they felt the particular feeling or condition, and were asked to respond on a six-point Likert scale. Response categories for question 44 were: 'all of the time', 'most of the time', 'a good bit of the time', 'some of the time', 'a little of the time', and 'none of the time', while question 45 used a similar six-point response scale which ranged from 'always', 'very often', 'fairly often', 'sometimes', 'almost never', and 'never'.

The MHI item 'downhearted and blue' was selected for inclusion in this survey to reduce respondent burden and provide an efficient means to assess mental health and well-being. This MHI-5 item was selected because all available evidence suggests that it has the capacity to adequately assess mental health and well-being. Berwick, *et al.* (Berwick et al., 1991) showed that in a sample of newly enrolled members of an eastern Massachusetts health maintenance organization (n=5,291), the MHI-5 performed as well as the GHQ (the gold standard in community psychology) in detecting any disorder from the Diagnostic Interview

Schedule (DIS), the widely accepted gold standard in psychiatric diagnosis, as well as anxiety disorders and major depression. Even better results for the MHI-5 were shown by Weinstein, *et al.* (Weinstein, Berwick, Goldman, Murphy, & Barsky, 1989). They found that the MHI performed significantly better than the GHQ in detecting mental disorders generally, and anxiety disorders specifically, and was somewhat better in detecting affective disorders. The question 'downhearted and blue' is a single item in the MHI-5, and the same studies by Berwick *et al.* (Berwick et al., 1991) and Weinstein *et al.* (Weinstein et al., 1989) showed that this single item had nearly as much predictive power as the 5-item scale. On the strength of this evidence, the mental health indicator used in this study was the 'downhearted and blue' question from the MHI-5.

Questions 46-48: Social Support Measures

Questions 46-48 sought to measure the social support available to the respondent. The importance of this follows from studies showing the strong influence of social support in shaping health status (House et al., 1988). It is not merely the quantity of social support that is important, it seems, in shaping health, it is also the (more difficult to measure) *quality* of social support (Orth-Gomer & Unden, 1987). Therefore, questions 46 and 47 addressed two of the important functions social support is believed to provide, namely, someone to confide in, talk about problems, etc.—such interaction is a fundamental building block of social identity, to the extent that we gain insight into who we are through the ways that others know us. Question 47 is a valuable question as it measured those aspects of social support that create "increased senses of predictability, stability and control because they [social relations] provide the opportunity for regularized social interaction and the concomitant feedback that allows for the

adoption of appropriate roles and behaviors" (Cohen & Syme, 1985, p. 6). Question 48, satisfaction with social activities, is probably one of the better indicators of the presence or absence of social support, and more importantly its impact on respondents' lives, particularly in the areas of perceived control over life circumstances, ontological security and social identity.

Questions 49-84: Supplementary Socio-Demographics, Income, and Household Finances

The next few items in the questionnaire consisted of questions about respondents' socio-demographic characteristics, including gender, marital status, educational attainment, year of birth, annual household income, number of adults working full-time and part-time in the household, the household's major source of income, respondent's ethnicity, and language regularly used in the household. Most of these questions concerned individuals' category of identity or status, and were important because of the way that power relations cut across lines of social differentiation such as gender, ethnicity, income, and educational attainment, for instance, with important consequences for individuals' life chances.

3.3 Survey administration

This investigation uses a cross-sectional population survey to address the questions described above. The survey was administered by telephone to a random sample of households in Vancouver's 12 neighbourhood areas (n=650 total). The neighbourhoods were defined on the basis of a recent mortality atlas of Vancouver that roughly conform to neighbourhoods used by the City of Vancouver's Planning Department for neighbourhood area planning. Survey administration was conducted in a way that attempted to achieve a fairly equal number of completed interviews across the 12 neighbourhood areas.

The survey was administered by Points of View Research Inc. between May 3, 1999 and June 16, 1999. The study was introduced to potential participants as a study of 'quality of life in Vancouver neighbourhoods". The sampling frame was purchased from Dominion Directories Information Services, a division of the Stentor Group of Companies and the company charged with the task of compiling the telephone books for most Canadian cities. Their listings are updated monthly, and contain all households and businesses with telephones. Their listings do not, however, include unlisted telephone numbers. A random sample of 5,000 telephone numbers with Vancouver forward sortation area postal codes were purchased from Dominion for use as the sampling frame. Points of View' Computer Assisted Telephone Interviewing (CATI) system then drew telephone numbers randomly from the sample frame until the requested number of interviews had been achieved (n=650, based on budget constraints). A summary of the telephone contact information for the survey appears in Table 3.3. It shows that in total, 4,137 numbers were attempted; 3,962 were deemed 'eligible' (i.e., in service, not a fax, not a business); 2,965 potential respondents were contacted and asked to participate, and 2,054 respondents agreed to participate (co-operative contacts). Of these, 1,404 were disqualified, usually because the quota for their postal code had been reached. The remaining 650 completed interviews and constitute the sample for this research. Overall, the administration of this questionnaire had a refusal rate of 30.7%, a crude response rate of 51.8% (co-operative contacts ÷ total eligible), and an adjusted response rate of 69.3% (co-operative contacts ÷ total asked). It is also important to note that although most respondents answered all the questions in the questionnaire, there were some that respondents refused to answer. The question on income is the most notable of these—roughly 30% of respondents who completed the interview refused to answer the income question. On the whole, however, these response rates are very good.

TABLE 3.3: RECORD OF CONTACT AND RESPONSE RATES

	Disposition of Last Attempt	*Total # of Households Attempted*	*Explanatory Notes*
A	**Total Numbers Attempted**	**4137**	**Total of Lines 1 to 14**
1	Not in service	136	
2	Fax / modem	28	
3	Business / government	11	
B	**Total Eligible Numbers**	**3962**	**Total of Lines 4 to 14**
4	Busy	24	
5	Answering machine	220	
6	No Answer	223	
7	Language	330	
8	Illness, incapable	23	
9	Selected resp. not avail.	177	Includes outstanding callbacks and appointments
C	**Total Asked**	**2965**	**Total of Lines 10 to 14**
10	Household Refusal	156	Before respondent selected
11	Respondent Refusal	750	Before answering qualifying questions
12	Respondent Break Off	5	Any terminating after qualifying
D	**Co-operative contacts**	**2054**	**Total of lines 13 and 14**
13	Disqualified	1404	Any disqualification of household or respondent during screening process. Includes quota filled if identified during screening.
14	Completed interview	650	
	REFUSAL RATE=(10+11+12)/C	**30.7%**	**Total refused divided by total asked**
	RESPONSE RATE A = D/B	**51.8%**	**Willing respondents divided by total eligible numbers**
	RESPONSE RATE B = D/C	**69.3%**	**Willing respondents divided by total asked**

CHAPTER 4: ANALYSIS AND RESULTS

The analysis was undertaken in three stages. First, descriptive results from the social survey were compiled for housing, socio-demographic indicators, and health outcomes. The second stage of the analysis investigated relationships between single housing, socio-demographic and other explanatory variables on the one hand, and single health outcomes, on the other, using simple non-parametric tests to detect significant differences between sub-groups. In the third stage logistic regression modelling is used to analyze the simultaneous influence of the various explanatory variables upon the health outcomes. Specifically, the analysis seeks to identify factors related to housing that, along with other social factors (socioeconomic status (SES), social support, coping skills, etc.), could simultaneously influence health status. The logistic regression model is guided by the analytical model shown in Figure 1 and discussed in Chapter 2 .

4.1 Descriptive Results

Health Outcome Measures

Three health outcome measures were included in the survey: self-rated health status, satisfaction with health, a mental health assessment item, and a stress burden assessment item. Self-rated health status is a highly reliable and valid measure of general overall health status. Previous studies have shown it correlates well with a number of 'harder' mortality and morbidity measures, across most age groups and both genders. The distribution is skewed towards better self-ratings of health, which is common in surveys of the general population.

Self-Rated Health Status

	Frequency	Percent
Excellent	203	31.2
Very good	214	32.9
Good	165	25.4
Fair	54	8.3
Poor	14	2.2
Total	650	100.0

Similar results are shown for satisfaction with health. The distribution is skewed towards greater satisfaction with health, but again, this is common in surveys of the general population.

Satisfaction with Health

	Frequency	Percent
Very satisfied	298	45.8
Somewhat satisfied	290	44.6
Not too satisfied	50	7.7
Not at all satisfied	12	1.8
Total	650	100.0

In addition to measures of general or overall health status, a one-item indicator of mental health status was included in the survey. Respondents were asked to indicate how frequently over the previous two weeks they had felt 'downhearted and blue'. Once again the distribution of responses is skewed towards better mental health (less frequency of feeling blue), but as with all the health measures there is sufficient variation for investigating relationships between housing, socioeconomic status, and health.

Over the past 2 weeks, how often have you felt downhearted and blue?

	Frequency	Percent
All of the time	6	0.9
Most of the time	24	3.7
A good bit of the time	23	3.5
Some of the time	122	18.8
A little of the time	247	38.0
None of the time	228	35.1
Total	650	100.0

The final of the health-related questions in the survey asks respondents to indicate how often over the previous two weeks they felt 'constantly under stress'. Stress is hypothesized to be an important mediating variable in the relationship between socioeconomic status and health.

Over the past 2 weeks, how often have you felt constantly under stress?

	Frequency	Percent
Always	23	3.5
Very often	68	10.5
Fairly often	80	12.3
Sometimes	200	30.8
Almost never	148	22.8
Never	131	20.2
Total	650	100.0

Basic Socio-Demographic Results

The survey produced a sample of respondents whose age is skewed towards adults between the ages of 25 and 44 (roughly 50% of the sample falls within this range). About 10% of the sample was aged 18-24 and another 10% was 65 years of age and above. The remaining roughly 25% of respondents fell in the 45-64 age range.

Age Distribution of Sample Respondents

	Frequency	Percent
18-24 yrs	68	10.5
25-34 yrs	188	28.9
35-44 yrs	149	22.9
45-54 yrs	124	19.1
55-64 yrs	47	7.2
65-74 yrs	36	5.5
75 or older	32	4.9
Refused	6	0.9
Total	650	100.0

Just over 75% of survey respondents reported that their marital status was single or married, with almost 9% reporting that they were in a common-law relationship, 5% widowed and another roughly 9% divorced or separated. Past research has indicated a health-enhancing effect of marriage, especially for older males.

Respondent's Marital Status

	Frequency	Percent
Married	271	41.7
Common-law / living with partner	56	8.6
Widowed	34	5.2
Divorced	35	5.4
Separated	21	3.2
Single	225	34.6
Refused	8	1.2
Total	650	100.0

The table below shows that in terms of educational attainment, the sample has a high proportion of people having completed university (in excess of 45%). Yet it is also the case that about 25% of the sample has no post-secondary education at all.

Respondent's Educational Attainment

	Frequency	Percent
Less than grade 9	7	1.1
Some high school	32	4.9
Completed high school	120	18.5
Some trades / technical training	21	3.2
Completed trades / technical training	48	7.4
Some university	98	15.1
Completed university	229	35.2
Some post-graduate	18	2.8
Completed post-graduate	71	10.9
Refused	6	0.9
Total	650	100.0

One of the foundations of a population health perspective is that there is a monotonic gradient in health status by income, so that across the entire income spectrum, those with higher incomes

enjoy better health status. In addition, income level is an important contributor to housing affordability. One of the hypotheses guiding this research is that one way that housing can influence health status is through affordability. The income distribution of this sample is a relatively even one, although there is an unusually high proportion of respondents with a household income greater than $100,000.00.

Household Income Reported by Respondent

	Frequency	Percent
Less than $10,000	26	4.0
$10,000-$14,999	40	6.2
$15,000-$19,999	29	4.5
$20,000-$24,999	29	4.5
$25,000-$29,999	38	5.8
$30,000-$39,999	56	8.6
$40,000-$49,999	65	10.0
$50,000-$59,999	40	6.2
$60,000-$69,999	40	6.2
$70,000-$79,999	28	4.3
$80,000-$89,999	14	2.2
$90,000-$99,999	17	2.6
$100,000 or more	75	11.5
Total valid responses	497	76.5
Don't know / refused	153	23.5
Total	650	100.0

Housing and Household Data

The data reported in this section cover issues related to housing and the composition of households. The table immediately below shows the average size of households, the ratio of bedrooms per person, and the average length of residence in both the dwelling and the neighbourhood. Also, one of the ways in which housing can be particularly influential on health is through its role on people with disabilities—appropriate housing can clearly ameliorate or exacerbate the impacts of a disability on health and well-being.

Basic Household and Respondent Characteristics

% female	54.3%
Mean number of people per household	2.53
Median number of people per household	2.0
Mean crowding index (bedrooms per person)	1.04
Mean length of residence in current **dwelling** (years)	7.18
Median length of residence in current **dwelling** (years)	3.04
Mean length of residence in current **neighbourhood** (years)	10.1
Median length of residence in current **neighbourhood** (years)	5.0
% of households with resident with a physical disability	7.8%
% of sample households requiring modification to accommodate a household member's disability	2.6%

The survey sample includes a roughly equal distribution people living in single or detached houses as in apartments (either in low-rise, high-rise or self-contained). While the type of dwelling alone is unlikely to be influential upon health status, some dwelling types may be more appropriate or desirable for some households than others, and through that pathway may influence health.

Dwelling Type of Respondents

	Frequency	**Percent**
Single house	250	38.5
Semi-detached house	66	10.2
Self-contained apartment	57	8.8
Low rise apartment	172	26.5
High rise apartment	103	15.8
Something else	2	0.3
Total	650	100.0

Housing tenure has the capacity to influence health status through at least two potential pathways, both benefiting owners. Owner-occupiers of housing have the capacity to generate

and store a great deal of wealth through tax exemptions of capital gains and imputed rents, thereby changing their position in the income distribution. Moreover, home ownership confers upon its benefactors an enormous security of tenure and control over life circumstances. Control over life circumstances is believed to be one of the ways in which greater social status influences health status. In this sample, 45.5% of respondents reported that they own their home (irrespective of title type), while 4.2% reported living in co-operative housing.

Forms of Tenure

	Percent
% of respondents who own their home	45.4%
% of homeowners whose ownership is strata title	22.0%
% of total respondents who live in co-operative housing	4.2%

Recent perspectives on the social gradient in health suggest that not only are the direct effects of material inequalities important in the social production of health, but likely equally important are the social meanings attached to our material circumstances. On this view, it is not absolute affordability of housing that would be the crucial test of its influence on health, but rather individuals' perceptions of affordability. Consequently, respondents were asked to evaluate how difficult their household found it to meet its housing-related costs, and to rate it on a four-point scale. Over 40% said they found it at least somewhat difficult, while 58% said they found it not at all difficult or relatively easy to do so.

How difficult do you find it to meet your housing-related costs?

	Frequency	Percent
Extremely difficult	54	8.3
Somewhat difficult	219	33.7
Not at all difficult	207	31.8
Relatively easy	170	26.2
Total	650	100.0

In addition to affordability, suitability of housing is a key concern in housing research, and has potential health impacts. In this survey, respondents were asked to rate their satisfaction with various features of their dwelling. While it is clear that a high percentage of respondents were at least satisfied with these features of their dwellings, subsequent analyses will investigate the complete range of satisfaction ratings and their relative influence on health status.

Satisfaction with Various Features of Respondents' Dwellings

% satisfied or very satisfied with....	
Sunlight exposure	86.5%
Noise from inside building	84.5%
Noise from outside building	74.6%
Amount of space	81.7%
Heating	83.4%
Indoor air quality	86.6%
Safety and security of dwelling	78.8%
Overall dwelling satisfaction	90.5%

Similarly for respondents satisfaction with their dwellings, there is a high degree of satisfaction with various aspects of one's neighbourhood reported by survey respondents. Once again, the high levels of satisfaction (except for amount of traffic, which is lower) do not fully reveal all of the variation to be investigated in subsequent stages of the analysis.

Satisfaction with Various Features of Respondents' Neighbourhoods

% satisfied or very satisfied with....	
Parks and green space	85.7%
Amount of traffic	62.8%
Recreational facilities	78.6%
Personal safety	80.9%
Overall satisfaction with neighbourhood	90.2%

It has been argued elsewhere that the major factors that seem to drive the social production of health concern issues around power relations, social status, identity and control over life circumstances. A number of questions were included in the survey to investigate these constructs empirically, and the results of these questions appear in the table below.

The results show that a relatively high proportion of respondents either agreed or strongly agreed that they felt like they belonged in their neighbourhood, that they were proud to live in their neighbourhood, that they were proud to show their home to visitors, that their home provides a good place to live their life, and that their home is a good reflection of who they are. At the same time a relatively small proportion of respondents agreed that they 'can't stand to be at home sometimes' or that they 'often worry about being forced to move'. Again, there is still enough sample variation to investigate how these factors influence health status.

Housing and Neighbourhood Demand / Control / Identity Measures

% agree or strongly agree	
I feel like I belong in neighbourhood	85.2%
I feel proud to live in my neighbourhood	84.5%
I am proud to show my home to visitors	81.1%
I can't stand to be at home sometimes	22.2%
My home provides a good place to live my life	90.3%
I often worry about being forced to move	12.6%
My home is a good reflection of who I am	80.6%

Finally, a number of questions were included in the survey to investigate the social support enjoyed by respondents in general, and the social support they had available through neighbourly social relations. Social support is a well-established correlate of health status, but the role of neighbourly support is still under-investigated. The results from this sample suggest some contradictory results. A relatively small proportion (30%) of respondents reported that they thought their neighbours were 'very friendly', despite more than two-thirds of respondents

reporting that they talked to their neighbours 1-2 times per week or more. More consistent, however, is that a small proportion of respondents (13.5%) reported that they exchange help with their neighbours 1-2 times per week or more. Functional support is one of the ways in which social support is presumed to shape health status.

In terms of general support, roughly 95% of respondents reported that they had someone to confide in about personal matters and that they had someone available in their life to help them if they needed it. A slightly smaller (but still large) proportion (85%) reported that they were at least somewhat satisfied with their social activities. Again, there is considerably more variation available for investigation in subsequent analyses.

Social Support and Neighbourly Ties

% reporting neighbours 'very friendly'	30.8%
% who talk w/ neighbours 1-2 times / week or more	68.5%
% who exchange help with neighbours 1-2 times / week or more	13.5%
% who have someone to confide in	94.3%
% who have someone to help if they need it	96.3%
% somewhat or very satisfied with social activities	84.9%

The above descriptive statistics form the basis for the more sophisticated analyses of relationships between individual housing attributes and characteristics, as well as socio-economic characteristics, on the one hand, and individual health status on the other. In the next section, a long list of individual socio-economic, dwelling, and household characteristics, as well as dwelling and neighbourhood satisfaction and meaning variables are tested for their association with self-rated health status, health satisfaction, and mental health status.

4.2 Exploring Housing and Health Relationships

A summary of the results of statistical tests between individual housing and socio-economic variables, on the one hand, and health outcomes on the other, appears in Table 4.1.

Outcome variables appear along the horizontal title, and the set of explanatory variables investigated are listed in two columns below. For every possible explanatory - outcome variable pair there is a cell in the table (189 cells). Asterisks in the cell indicate that the test was statistically significant (* $p < .05$; ** $p < .01$; *** $p < .001$). The other piece of information sought in this analysis beyond that of the statistical significance was the existence of a 'gradient' in effect between the explanatory variable and the health outcome. In each cell that showed a statistically significant relationship, therefore, there also appears either a number, the symbol 'NG', or a lower case letter (a, b, c, etc.). The number refers to the strength of the gradient observed (best possible = 5 for health status and mental health, and 4 for health satisfaction). The symbol NG implies there was no observable gradient despite a statistically significant relationship between the two variables. The letters refer to footnotes at the bottom of the table. None of these tests showed a reverse gradient (thereby contradicting expectations).

A number of different tests were used to investigate these bivariate relationships. A conservative approach was taken with respect to the analysis and so-called 'non-parametric' tests were used because they do not assume normally distributed data. The Kruskal-Wallis test[1] was used to examine differences between the health measures and polychotomous independent variables, with the independent variable as the grouping variable (e.g. education, income, income source, satisfaction with dwelling, etc.). This test ranks all cases according to their value on the test variable (the health outcome in this case) and then examines differences in the mean rank between independent sample groups on the explanatory variable (Norman & Streiner, 1994). For differences between the health measures and dichotomous explanatory variables, a Mann-Whitney U-test was used[2]. Finally, for tests involving either self-rated health

[1] This is the nonparametric equivalent of the one-way analysis of variance.
[2] This is the nonparametric equivalent of a t-test.

status or satisfaction with health and a continuous explanatory variable (e.g., crowding index, etc.), the Kruskal-Wallis test was used. Although use of this test involves a small loss of information because it is based on ranks and not the actual values that are available in continuous data, it was selected over the parametric t-test for its less stringent assumptions regarding the distribution of the data.

Referring to observed relationships in Table 4.1, amongst the entire sample, those who were older were more likely to report lower health satisfaction, those with lower incomes were more likely to report poorer general health and lower health satisfaction, while those with lower incomes adjusted for household size[3] were more likely to report poorer health, lower health satisfaction and poorer mental health. Similarly, those with lower education were more likely to report poorer health on all three measures. With respect to marital status, those who were divorced were more likely to report lower health satisfaction and poorer mental health. In terms of employment status, respondents who were disabled or laid off / unemployed were more likely to report poorer health on all three measures, while homemakers and those employed full-time were more likely to report better health on all three measures. There was a weak influence of one's job class on health—labourers, clerical workers, and service workers were more likely to report poorer mental health. Finally in this group of variables measuring socio-demographic characteristics, respondents who reported that they had a disability were more likely to report poorer health status on all three measures.

The next group of variables concerns the dwelling that households occupied as their primary residence. A few weak relationships with health status are evident here. Respondents living in an apartment within a house reported poorer mental health, respondents who had more

[3] Income was adjusted for household size by dividing each household's income by the square root of the household size. This is a common approach that accounts for economies of scale in household production.

TABLE 4.1: BIVARIATE RELATIONSHIPS BETWEEN HOUSING AND HEALTH IN VANCOUVER							
EXPLANATORY VARIABLE (* p < .05; ** p < .01; *** p < .001)	**HEALTH STATUS**	**HEALTH SATISFAC.**	**MENTAL HEALTH**	**EXPLANATORY VARIABLE** (* p < .05; ** p < .01; *** p < .001)	**HEALTH STATUS**	**HEALTH SATISFAC.**	**MENTAL HEALTH**
age		*** (4)		can't stand to be at home?	** (4)	** (4)	*** (5)
gender				home a good location for life?	** (4)	** (3)	* (4)
income	*** (4)	*** (3)		worry about having to move?	** (4)	** (4)	** (4)
income adjusted for hhold size	*** (4)	*** (3)	** (4)	feel like you belong in hood?		*** (3)	* (3)
education	*** (4)	** (3)	*** (4)	proud of neighbourhood?	** (3)	* (3)	
marital status		* (b)	* (b)	proud of dwelling?	*** (4)	*** (3)	*** (4)
ethnicity				home reflects identity?	*** (4)	** (4)	
income source				exposure to sunlight	* (4)	** (3)	
working status	*** (e)	*** (e)	** (e)	noise from inside bldg	* (4)	** (3)	* (4)
job class			* (f)	noise from outside bldg		*** (4)	
disability	***	***	**	amount of space	** (5)	*** (4)	*** (4)
age of dwelling				heating	** (4)	*** (4)	* (5)
dwelling type			* (a)	indoor air quality	*** (5)	*** (4)	*** (4)
no. of bedrooms	*	* (4)		safety & security of dwelling	*** (5)	*** (4)	
housing tenure		*	**	overall dwelling satisfaction	*** (4)	*** (4)	*** (5)
dwelling in a strata council?	*			dwelling score	*** (5)	*** (4)	*** (4)
dwelling part of a co-op?				parks and greenspace	*** (3)	*** (R3)	* (4)
household type	* (c)		*** (d)	amount of traffic		*** (4)	* (3)
no. persons in hhld	* (3)			recreation facilities	*** (4)	*** (4)	
crowding index (brs/persons)				personal safety	*** (4)	*** (3)	
length of residence in dwelling				neighbourhood as a whole	** (4)	*** (3)	** (3)
length of residence in 'hood				neighbourhood score	*** (4)	*** (4)	
monthly housing expenditure	* (4)		* (4)	neighbourhood dummy variable	** (g)		
housing $$ as % of income	** (5)		* (4)	east or west side?	***	**	
housing $$ as % of adj. income				how friendly are neighbours?	** (NG)	* (3)	** (4)
housing $$ > 30% adj. income?	*			talk with neighbours - frequency	* (4)	* (3)	*** (4)
home equity				help to/from neighbours - freq			
capital gains (owners only)			* (4)	have a confidant?	***	*	***
capital gains (renters = 0)				have someone to help?	*		***
housing costs a strain?	*** (5)	*** (3)	*** (4)	satisfaction w/ social activities	*** (5)	*** (4)	*** (5)
hours of housework (weekly)							
strain of housework	*** (4)	*** (4)	*** (5)				
general stress (self-report)	* (5)	*** (4)	*** (5)				

a. apt. in house ⇒ poorer health.
b. divorced = poorer health; married = better health.
c. adult w/ child = poorer health; single adult w/ parents = poorer health.
d. 2 or more unrelated, single parent = poorer health.
e. Disabled, laid off/unemployed = poorer health; homemaker, f/t empl = better health.
f. labourer, clerical, service workers ⇒ poorer mental health.
g. Sunrise, Renfrew ⇒ poorer health.

bedrooms reported better general health and greater health satisfaction, those who owned their homes reported greater health satisfaction and better mental health, and amongst apartment dwellers, those who lived in a building managed by a strata council were more likely to report better general health.

Next in the table are variables concerning attributes of the household that respondents live in. Again, there are a few weak relationships with health status. Single parents and single adults living with their parents were more likely to report poorer general health status, while single parents and respondents living with 2 or more unrelated people were more likely to report poorer mental health. There was also a weak relationship between number of persons in the household and general health status.

Housing is typically the largest single item in a household's monthly budget and commonly represents a household's most valuable asset. As such, it has the capacity to be the source of a significant amount of financial stress. The results for the next group of variables shows that to some extent, the stresses associated with the financial importance of housing translate into health status differences. There was a fairly strong gradient in the relationship between households' total monthly housing expenditure and both general and mental health. There was a very strong graded relationship between housing costs as a proportion of total income and general health status and a similar, but weaker relationship with mental health. Those respondents who reported that their household spent greater than 30% of their monthly income (adjusted for household size) on housing-related costs were more likely to report poorer general health. Amongst owners only, those who reported higher capital gains (in 1996 dollars) on their primary residence were more likely to report better mental health. Amongst all respondents, with renters' capital gains included as '0', there was no relationship between

capital gains and health. One important limitation of these financial-oriented data is that many respondents refused to reveal all the information required to calculate these figures to interviewers. In particular, amongst the 295 owners surveyed, capital gains could only be calculated for 167 (56.6%). Amongst all respondents, annual income was only available for 77.4% and total monthly housing expenditure was only available for 66.8%. For the final indicator in this section, however, all respondents provided an answer to the question: "how much of a strain do you find it to meet your monthly housing costs?". Greater strain was strongly related to poorer general health status, more weakly related to lower health satisfaction, and fairly strongly related to mental health status.

Another important source of stress coming from the domestic sphere is housework. Each respondent was asked how many hours of housework they do in a typical week, and then they were asked to rate how much of a strain it is for them to do that housework. Absolute amount of housework was completely unrelated to any of the health measures, but those who reported greater strain of housework were more likely to report poorer general health, lower health satisfaction, and poorer mental health status. Similarly, the general stress measure showed a strong relationship with all three health status measures in the expected direction: more stress implies poorer general and mental health and lower health satisfaction.

Turning now to the right-hand column of Table 4.1, the first group of variables were measures developed specifically for this study. They attempt to tap some dimensions of demand and control in the domestic sphere. Studies of workplace organization and health show that jobs with high demand and low control put workers at higher risk for a wide variety of adverse health outcomes (Karasek & Theorell, 1990). It follows that if demand and control are important dimensions of work life for health, they are likely to be important dimensions of

home life too. The results of this analysis suggest that demand and control are indeed important dimensions of the domestic sphere for health. Those who agreed more strongly that they 'hate to be at home sometimes' were more likely to report poorer general health and much more likely to report lower health satisfaction and poorer mental health. This measure reveals something about the importance of having a comfortable home as a place of refuge for health. The next measure concerns the 'workability' of one's housing for conducting their life in a meaningful and smooth manner. Respondents who agreed more strongly that their home was a good location to live their life were more likely to report better general health status, greater health satisfaction, and better mental health status. Finally in this section, respondents who agreed more strongly that they worried about being forced to move from their present home (an indicator of control over the domestic sphere) were more likely to report poorer general health status, lower health satisfaction, and poorer mental health status.

In Chapter 2 it was argued that not only was control likely to be an important dimension of the domestic sphere for health, so too were issues related to individual identity and social status. Our homes and the neighbourhoods where they are located are important mediums of self-expression and an important symbolic display of social status. The results of analyses with the four indicators developed to investigate these dimensions confirm this hypothesis. Respondents who agreed more strongly that they 'feel like they belong' in their neighbourhood were somewhat more likely to report greater health satisfaction and better mental health status. Those who reported that they were proud to live in the neighbourhood they do were somewhat more likely to report better general health status and greater health satisfaction. But the identity/status features of one's dwelling appear to be even more important than those of the neighbourhood. Respondents who agreed more strongly that they are 'proud to show their

home to visitors' were more likely to report better general health status, greater health satisfaction and better mental health, and all relationships were fairly strong. Those who agreed more strongly that their home is 'a good reflection of who they are' were more likely to report better general health and greater health satisfaction. Identity and status, in short, are confirmed as important elements of housing and the domestic sphere for health.

The next two groups of questions asked respondents to rate their satisfaction with various features of their dwelling and their neighbourhood and to rate their satisfaction with their dwelling and neighbourhood overall. Also, a score summarizing respondents ratings of both the dwelling features and the neighbourhood features was calculated. The results suggest that specific features of people's dwellings can be very strongly associated with health status, as can their overall satisfaction with their dwelling. In terms of neighbourhood characteristics, people's level of satisfaction is only moderately associated with their health status. The 'neighbourhood dummy variable' item in the list refers to a simple test that looked for statistically significant differences in health status across the 12 neighbourhood areas used to organize this study. The results show that the Renfrew and Sunrise neighbourhoods showed significantly poorer general health status than the other neighbourhoods. Self-rated health status by neighbourhood area is displayed graphically in the map that appears as Figure 4.1. Darker areas indicate a higher mean rank on self-rated health status—in other words, poorer health. Similarly, the 'east or west side' item split the city's neighbourhoods into two groups and a test for significant differences in health status was conducted. It showed that those living on the west side were significantly more likely to report better general health status and greater health satisfaction than those on the east side. This is consistent with expectations as the east

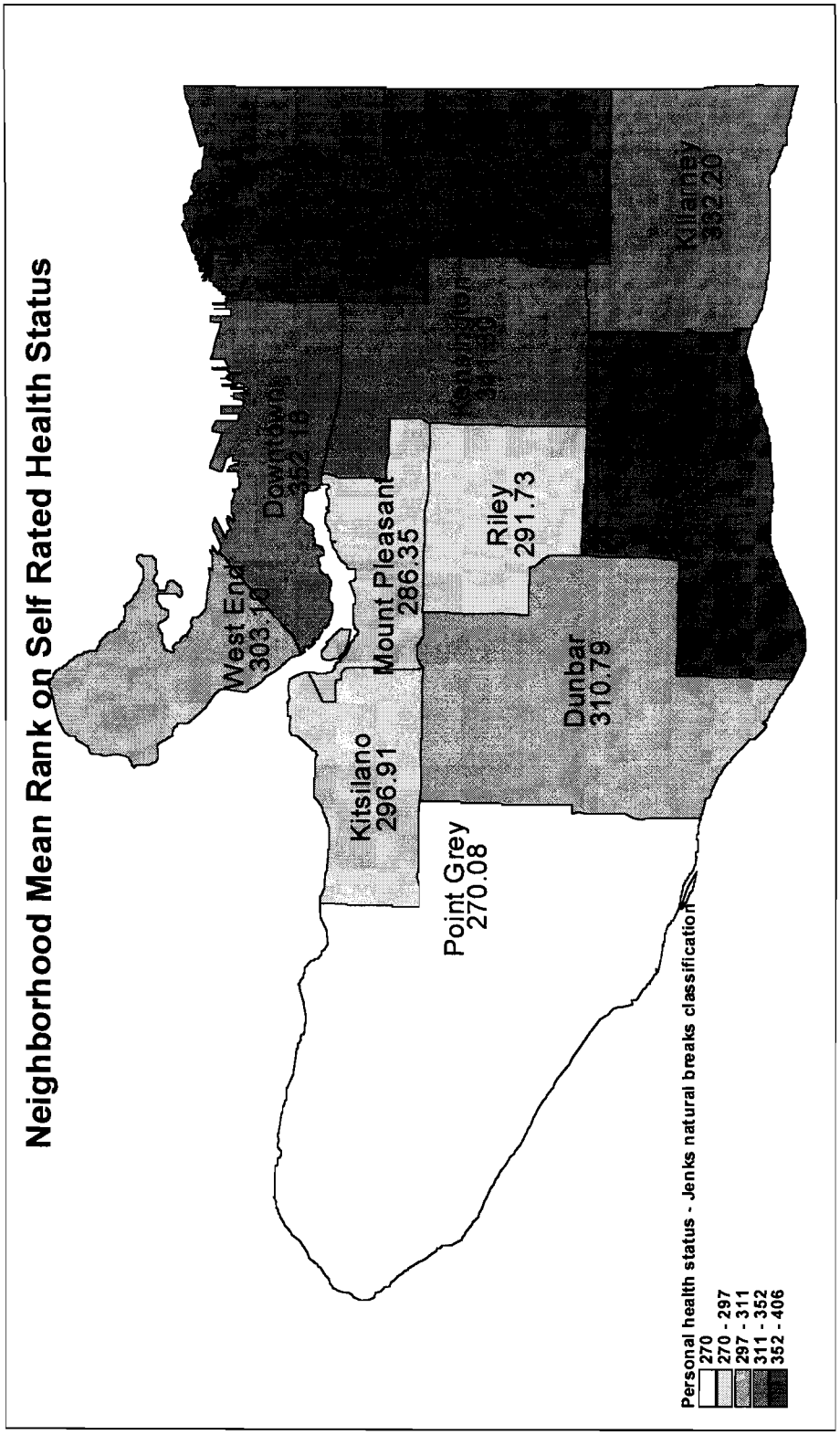

Neighborhood Mean Rank on Self Rated Health Status
West End
303.10
Mount Pleasant
286.35
Riley
291.73
Dunbar
310.79
Kitsilano
296.91
Point Grey
270.08
Killarney
332.20
Personal health status - Jenks natural breaks classification
270
270 - 297
297 - 311
311 - 352
352 - 406

Figure 4.1

side tends to be a slightly lower income population with somewhat poorer quality, although more affordable housing.

The final two groups of variables concern social support, which consistently demonstrates a very strong relationship with a variety of health status measures in population surveys. First, analyses were conducted to determine the association between neighbourly social ties and health. The results show that those who reported that their neighbours were more friendly were more likely to report greater health satisfaction and better mental health. Similarly, respondents who reported that they talk with their neighbours more frequently were moderately more likely to report better general health status, greater health satisfaction, and better mental health status.

In terms of overall social support, all three indicators of social support were significantly associated with at least two health outcome measures. Respondents who reported that they had somebody close whom they could confide in and talk about personal problems were more likely to report better general health status, greater health satisfaction and better mental health status. Respondents who reported that they had someone amongst their family and friends who could help them if they needed it were significantly more likely to report better general health status and better mental health. Finally, those respondents who reported greater satisfaction with their social activities overall were much more likely to report better health status, greater health satisfaction and better mental health status.

The bivariate tests conducted here demonstrate quite strong evidence that housing attributes and experiences of the domestic environment have the potential to influence both general and mental health status. In the third stage of the analysis, logistic regression modelling

is used to determine the importance of housing-related variables for health status when they are considered simultaneously with other socio-economic variables[4].

4.3 Modelling Housing, SES, and Health

Consistent with the conceptual underpinnings of the research, this section is concerned with determining whether, and how strongly, housing variables contribute to individual health outcomes when they are analyzed simultaneously with other socio-economic attributes of individuals. This also allows for the control of potential confounding variables, simply by making them eligible for entry into the model. Logistic regression modelling was selected as the statistical method because of its ability to accommodate both categorical and continuous variables (Norusis, 1995; Streiner, 1994). Logistic regression models were calculated for four outcome variables for the total sample.

Four outcome variables were used in this analysis because of the need to dichotomize the self-rated health outcome variable, which has five response options. It was therefore dichotomized in two different ways, the first is referred to in subsequent text and tables as 'self-rated health (A)' and this variable has the categories 'excellent / very good / good' on the one hand, and 'fair / poor' on the other. 'Self-rated health (B)', as it will be called, has the categories 'excellent / very good' and 'good / fair / poor'. The remaining two health outcome variables are the same as those used in the previous sections, namely, satisfaction with health (dichotomized as 'very satisfied / somewhat satisfied' and 'not too satisfied / not at all satisfied'). The mental health indicator, 'downhearted and blue' is dichotomized as 'all the time

[4] The same analysis was conducted separately for respondents who owned their homes and those who rented. The results are broadly similar, although where relationships exist, they are weaker than in the pooled analysis. The weaker relationships are likely due to the smaller sample in each of the sub-groups. The results of this segregated analysis can be found in Appendices B and C.

/ most of the time' on the one hand, and 'a good bit of the time / some of the time / a little of the time / never', where more often implies poorer mental health.

Explanatory variables measured at the ordinal level were also dichotomized by aggregating existing categories. These were considered individually, and in instances where a variable containing five categories had to be reduced to two, a conservative approach, based on the expected direction of effect, was taken. In other words, when choosing which new dichotomous category would be the aggregation of two existing categories and which would be the aggregation of the other three, two categories were placed in the new category hypothesized to be more likely to be related to the outcome. So, for example, pride in one's dwelling was hypothesized to be positively related to the health outcomes, and so in dichotomizing that variable, respondents who strongly agreed or agreed were aggregated in one category, and respondents who were neutral, disagreed, or strongly disagreed were placed in the other category.

In calculating the logistic regressions for each outcome, a model was constructed sequentially whereby each block of variables from Figure 1 that applied, was entered in an additive fashion, keeping only those variables that made a contribution to the model before adding the next block. The only exception to this was in the case of the first two variable blocks (at the left of Figure 1) which were forced into the model because of the *a priori* importance of each. Age and gender are important factors to control for in each model, so they were forced in. Income, employment status, and education, as important indicators of social status that have repeatedly been shown to be related to health status, were also forced in, within the same block. A block of the more important housing indicators, like tenure, co-operative dwelling, crowding index, and dwelling type (apartment or house), were also forced in because of their theoretical

importance to this investigation. Models were run using a backward stepwise elimination procedure, and variables were judged to contribute to the model if the significance level for the Wald inclusion statistic was 0.10 or lower.

The results of the logistic regression analyses appear in Tables 4.2 - 4.5. Each table shows the variables that entered the model, with those variables that made a statistically significant contribution bolded. Significance levels are indicated in a commonly used manner (*** $p<0.001$; ** $p<0.01$; * $p<0.05$). The relative odds and confidence interval are reported for each variable. Relative odds (e^{β}) is the factor by which the odds of having the outcome variable will change (from one category to the other) when the independent variable increases by one unit (or in the case of a categorical variable, changes from one category to another) (Norusis, 1995). If β is positive, the relative odds are greater than 1, which means the odds are increased. If β is negative, the relative odds are less than 1 meaning that the odds are decreased. Using neighbourhood satisfaction as an example (Table 4.2), the relative odds of 2.44 means that an individual who was **not** satisfied with their social life was 2.44 times more likely to report poorer health than someone who was satisfied. The 95% confidence interval shows that the best estimate of the relative odds was between 1.12 and 5.35. On the other hand, respondents who reported that housework was less of a strain were 3.33 times ***less*** likely ($3.33 = 0.30^{-1}$) to report poorer health.

Model performance indicators appear at the bottom of each table. They show that the logistic regression model for self-rated health (A) (Table 6) had a ρ^2 of 0.13 where ρ^2 measures goodness of fit for logistic regression. It is defined as one minus the ratio of the maximized log likelihood values of the fitted and constant-only-term models (Wrigley, 1985). ρ^2 ranges

from zero to one, and values between 0.2 and 0.4 represent a very good fit of the model (*ibid*). The model also correctly classified 71.7% of respondents.

Table 4.2: Logistic Regression Analysis Self-Rated Health Status (A)

Variable (*** p<0.001; ** p<0.01; * p<0.05)	Relative Odds (95% Confidence Interval)
Age	0.98 (0.79; 1.22)
Gender (female vs. male)	1.17 (0.75; 1.82)
Education (no high school diploma)	1.14 (0.42; 2.94)
Tenure (rent vs. own)	1.66 (0.99; 2.81)
Employment status	
employed p/t vs. employed f/t	0.56 (0.13; 2.30)
unemployed vs. employed f/t	1.54 (0.75; 3.19)
homemaker vs. employed f/t	0.94 (0.36; 2.49)
f/t student vs. employed f/t*	**3.03 (1.08; 8.46)**
retired vs. employed f/t	2.92 (0.97; 8.81)
other vs. employed f/t	0.55 (0.15; 2.05)
disabled v. employed full-time	1.63 (0.5; 5.33)
Disability (no vs. yes)	0.55 (0.24; 1.25)
Household type	
Single parent v. one adult alone	1.75 (0.62; 4.91)
Couple w/ no kids v. one adult alone	0.96 (0.52; 1.77)
Couple w/ kids v. one adult alone	2.15 (1.1; 4.2)
2 or more unrelated persons v. one adult alone	0.71 (0.34; 1.47)
Something else v. one adult alone	0.34 (0.06; 1.9)
Single adult living w/ family v. one adult alone	0.89 (0.21; 3.83)
Strain of housework	
No / not much strain v. great/some/mod strain?**	**0.30 (0.14; 0.65)**
Proud of neighbourhood (neut / disagree vs. agree)	1.19 (0.61; 2.29)
Proud of dwelling (neut / disagree vs. agree)*	**2.07 (1.15; 3.74)**
Neighbourhood satisfaction (dissatisfied v. satisfied)*	**2.44 (1.12; 5.35)**
Side of the city (east vs. west)*	**1.66 (1.05; 2.62)**
% correct: 71.7%	
$p^2 = 0.13$	

The model for the outcome self-rated health status (A) did not achieve a 'very good fit' ($\rho^2 = 0.13$). Based only on statistically significant effects in the model, respondents were more likely to report fair or poor health if they: were a full-time student as opposed to employed full-time, rated their housework as more of a strain, were not proud of their dwelling, were

dissatisfied with their neighbourhood, and lived on the east side. Except for the employment status relationship, all of these effects operate consistent with expectations. They also suggest that housing variables exert a relatively strong contribution to self-rated health status.

The logistic regression model for self-rated health status (B) (Table 4.3) did achieve a very good fit ($\rho^2 = 0.31$), and correctly classified 91.2% of respondents. Respondents were more likely to report good, fair, or poor health if they: were widowed as opposed to married / partnered, divorced or separated as opposed to married / partnered, had a disability, lived in a more crowded dwelling, lived in their neighbourhood longer, rated the strain of housework as great/some/moderate as opposed to none / not much, rated themselves as 'constantly under stress' more frequently, were dissatisfied with the amount of sunlight in their dwelling, and

Table 4.3: Logistic Regression Analysis Self-Rated Health Status (B)

Variable (*** p<0.001; ** p<0.01; * p<0.05)	Relative Odds (95% Confidence Interval)
Age	0.87 (0.63; 1.2)
Gender (female vs. male)	1.07 (0.5; 2.33)
Education (no high school diploma)	0.84 (0.22; 3.16)
Tenure (rent vs. own)	1.31 (0.53; 3.21)
Marital status	
Widowed v. married / partner**	**10.29 (2.26; 46.9)**
Divorced / separated v. married / partner*	**3.67 (1.16; 11.6)**
Single / never married v. married / partner	2.15 (0.82; 5.66)
Disability (no vs. yes)*	**0.15 (0.06; 0.40)**
Crowding index (bedrooms / person)**	**2.53 (1.29; 4.95)**
Length of residence in dwelling (years)*	**1.05 (1.001; 1.09)**
Strain of housework	
No / not much strain v. great/some/mod strain?***	**0.11 (0.04; 0.28)**
Constantly under stress	
always / very often vs. sometimes / never**	**5.17 (1.49; 17.9)**
Worry about forced move (neut / disagree vs. agree)	1.72 (0.68; 4.33)
Proud of dwelling (neut / disagree vs. agree)	1.82 (0.8; 4.14)
Sunlight (dissatisfied v. satisfied)**	**3.58 (1.58; 8.1)**
Side of the city (east vs. west)	2.11 (0.96; 4.65)
Social activities (dissatisfied v. satisfied)***	**4.63 (1.98; 10.8)**
% correct: 91.2 $p^2 = 0.31$	

were dissatisfied with their social activities. All but one of the effects seen in this model are consistent with expectations, except for length of residence in the neighbourhood, although this variable's influence on the health outcome is very weak. Housing variables (sunlight, housework, crowding) make up a sizeable, although not dominant part of the overall model.

Table 4.4: Logistic Regression Analysis for Health Satisfaction

Variable (*** p<0.001; ** p<0.01; * p<0.05)	Relative Odds (95% Confidence Interval)
Age	0.74 (0.5; 1.11)
Gender (female vs. male)	1.44 (0.66; 3.13)
Education (no high school diploma)	0.97 (0.20; 4.62)
Tenure (rent vs. own)	2.32 (0.92; 5.84)
Marital status	
Widowed v. married / partner	3.01 (0.57; 15.8)
Divorced / separated v. married / partner*	**3.53 (1.24; 10.1)**
Single / never married v. married / partner	2.15 (0.82; 5.66)
Employment status	
employed p/t vs. employed f/t	0.001 (0.00; ∞)
unemployed vs. employed f/t*	**0.34 (0.12; 0.98)**
homemaker vs. employed f/t	0.54 (0.14; 2.11)
f/t student vs. employed f/t	0.35 (0.07; 1.62)
retired vs. employed f/t	0.84 (0.14; 2.11)
other vs. employed f/t	0.00 (0.00; ∞)
disabled v. employed full-time	0.38 (0.06; 2.26)
Disability (no vs. yes)* **	**0.16 (0.06; 0.46)**
Strain of housework	
No / not much strain v. great/some/mod strain?* **	**0.18 (0.07; 0.45)**
Noise from outside (dissatisfied v. satisfied)**	**2.22 (1.04; 4.72)**
% correct: 91.6	
$p^2 = 0.25$	

The logistic regression model for the outcome 'satisfaction with health' (Table 4.4) achieved a very good fit ($\rho^2 = 0.25$) and correctly classified 91.6% of respondents. Respondents were more likely to report lower health satisfaction if they: were divorced / separated as opposed to married / partnered, were employed full-time as opposed to unemployed, had a

disability, rated their housework as great/some/moderate strain, and were dissatisfied with noise from outside their building. Only the employment status variable contradicts expectations, as it would be expected that unemployment would translate into lower health satisfaction. Apart from this, the model shows that housing variables make a contribution to health satisfaction, in tandem with marital status, disability, and employment status measures.

Table 4.5: Logistic Regression Analysis for Mental Health Indicator

Variable (*** p<0.001; ** p<0.01; * p<0.05)	**Relative Odds (95% Confidence Interval)**
Age	1.4 (0.87; 2.24)
Gender (female vs. male)	1.01 (0.34; 2.96)
Education (no high school diploma)	5.21 (0.39; 68.5)
Tenure (rent vs. own)	1.14 (0.29; 4.39)
*Disability (no vs. yes)****	0.77 (0.15; 4.04)
Household type	
Single parent v. one adult alone	0.001 (0.00; ∞)
Couple w/ no kids v. one adult alone	0.21 (0.18; 2.4)
Couple w/ kids v. one adult alone	2.83 (0.56; 14.4)
2 or more unrelated persons v. one adult alone	4.59 (0.93; 22.7)
Something else v. one adult alone	0.003 (0.00; ∞)
Single adult living w/ family v. one adult alone	2.30 (0.15; 34.4)
Stress (less often v. very often)**	**0.04 (0.01; 0.15)**
Hate home sometimes (agree v. neut /disagree)**	**6.75 (2.16; 21.06)**
Amount of traffic (dissatisfied v. satisfied)*	**0.26 (0.07; 0.91)**
Talk to neighbours (less v. more frequently)*	**4.12 (1.33; 12.8)**
Social activities (dissatisfied v. satisfied)*	**3.20 (1.01; 10.1)**
% correct: 95.5	
$p^2 = 0.42$	

Finally, the logistic regression model for the mental health indicator 'downhearted and blue' (Table 4.5) fit the data slightly less than optimally ($\rho^2 = 0.42$), although the model correctly classified 95.5% of respondents. Respondents were more likely to report feeling downhearted and blue in the last two weeks all or most of the time if they: reported being 'constantly under stress' more often in the past two weeks, agreed more strongly that they 'hate

to be at home sometimes', reported greater satisfied with the amount of traffic in their neighbourhood, talked to their neighbours less frequently, and were dissatisfied with their social activities. All but one of these statistically significant effects were consistent with expectations (the direction of influence of 'amount of traffic' was counter-intuitive) and housing-related variables are strong and significant factors in explaining variations in mental health status.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

Many argue that the most important research challenge for population health research on health inequalities is to better elucidate the social pathways and mechanisms that could account for the systematic social gradient in health observed in nearly every industrialized country of the world (Blomley, 1994; Dunn, 2000; Hayes & Dunn, 1998; Kaplan & W., 1997; Lynch & Kaplan, 1997; Macintyre, 1997; Syme, 1994). In particular, research is needed on the ways in which socio-structural influences manifest in systematic social gradient in the experience of multiple, overlapping stressors, the lifelong cumulative experience of which is believed to underlie the social gradient in health. It is well-established that social inequalities generated in the arena of housing are significant, and are centrally implicated in the social differentiation of everyday life. In this paper, we investigated relationships between social inequality, population health, and housing through a telephone survey (n=650) of neighbourhoods of Vancouver, Canada.

The analytical model that guides this investigation of relationships between socioeconomic status, housing and population health (Figure 1) suggests that individual and housing attributes are mediated by the experience of multiple, overlapping stressors of day-to-day life, of which housing is both a conduit and one source. Household characteristics, dwelling and neighbourhood satisfaction, the experience of control and demand in the domestic milieu and individuals' construction of meaning about their homes and domestic life are the specific mediating constructs used in this investigation.

The findings of the present study lend support to the contention that the multiplicity and overlapping of differentially distributed stressors (including dimensions of housing and home) have the capacity to shape health and well-being systematically across the social hierarchy. The

cross-sectional study design, the relatively small sample size, and the inability to measure all potential contributors to health status for inclusion in the analysis are important caveats in making such a conclusion based solely on the quantitative empirical analysis presented here, but the results are highly suggestive and imply the need for further investigation.

In particular, these results show that the meaning people invest in their homes, their satisfaction with their homes, and the amount of control they are able to exercise in the social and economic aspects of their domestic relations are empirically linked with self-reported status, health satisfaction and mental health status. Other variables that were linked to health status simultaneously with housing factors were consistent with the population health perspective and included social support, employment status, marital status, disability status, and self-reported stress level. Very little evidence of relationships that contradicted the population health perspective or the theoretical underpinnings of this research was found. The findings reported here, therefore, underscore the need for additional research in other contexts with larger random samples concerning ways that the material, meaningful, and spatial dimensions of housing shape the day-to-day experience of multiple, overlapping stressors for people at different points in the social hierarchy.

This research suggests that housing policy interventions can have health consequences, not only housing and financial implications. But because this study did not test specific housing policy interventions and their impact upon health, the policy implications can only be drawn indirectly. That said, the evidence from this study does provide valuable information that could be used to develop principles to guide housing policy in order to maximize the health of Canadians. Such principles could usefully address issues of housing affordability, the meaningfulness of housing, and demand and control in the domestic sphere.

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APPENDIX A:
Vancouver Neighbourhood Quality of Life Survey

Q.1 Neighbourhoods are an important part of housing issues, and we need to confirm which neighbourhood you live in. Is your postal code: READ POSTAL CODE, CHANGE IF NECESSARY.

_____

Q.2 We'd like to begin by asking you about the housing that you live in. 1. Which of the following best describes the dwelling you live in? READ LIST, ONE ANSWER ONLY.

single house not att ached to any other.. 1
semi-detached, duplx row house or townhou .. 2
self-contained apart ment within single.. 3
apartment or condomi nium in a low rise.. 4
apartment or condomi nium in a high 5
or something else (SPECIFY) 6

Q.3 Is your dwelling owned by any person in your household, or is it rented? IF RESPONDENT LIVES IN A HOUSEHOLD OWNED BY ANOTHER FAMILY MEMBER WHO DOESN'T LIVE THERE, CODE AS RENTER.

owned 1
rented 2
don't know ..3

Q.4 Is your dwelling part of a strata corporation?

Yes 1
No 2
Don't know ..3

Q.5 IF NO OR DON'T KNOW, Is your dwelling part of a housing cooperative?

Yes 1
No 2
Don't know ..3

Q.6 How many bedrooms are there in your dwelling, that is, those rooms used for sleeping?

Number of bedrooms .. ____

Q.7 To the best of your knowledge, in approximately what year was your dwelling originally built? READ LIST IF NECESSARY

before 1900 1
1900-1909 2
1910-1919 3
1920-1929 4
1930-1939 5
1940-1949 6
1950-1959 7
1960-1969 8
1970-1979 9
1980-1989 10
1990-1999 11
DON'T KNOW .. 12

Q.8 How long have you lived in this dwelling? 99=REFUSED, 98=DK

Years in dwelling .....____
Months in dwelling .. ____

Q.9 How long have you lived in this neighbourhood? 99=REFUSED, 98=DK

Years in neighbourhood .....____
Months in neighbourhood ..____

Q.10 Including yourself, how many people normally live in your household?

Number of people in household ..____

Q.11 Which of the following best describes your household? READ LIST, ONE ANSWER ONLY.

one adult person living alone 1
one adult with children 2
married couple - no children 3
married couple with children 4
common-law couple no children 5
common-law couple with children .. 6
two or more unrelated persons 7
or something else (SPECIFY) 8
DON'T KNOW/REFUSED 9
single adult living with parents 10
single adult living with relatives 11

Q.12 One important aspect of quality of life is having things in our homes and neighbourhoods that help us meet basic needs.

HIT ENTER .. 1

Q.13 How satisfied or dissatisfied are you with the following aspects of the interior of your dwelling?
PROBE FOR LEVEL a. Exposure to sunlight

Very satisfied 1
Satisfied 2
Neutral 3
Dissatisfied 4
Very dissatisfied ..5

Q.14 How satisfied or dissatisfied are you with the following aspects of the interior of your dwelling?
PROBE FOR LEVEL b. Noise from inside the building

Very satisfied 1
Satisfied 2
Neutral 3
Dissatisfied 4
Very dissatisfied ..5

Q.15 How satisfied or dissatisfied are you with the following aspects of the interior of your dwelling?
PROBE FOR LEVEL c. Noise from outside the building

Very satisfied 1
Satisfied 2
Neutral 3
Dissatisfied 4
Very dissatisfied ..5

Q.16 How satisfied or dissatisfied are you with the following aspects of the interior of your dwelling?
PROBE FOR LEVEL d. Amount of space

Very satisfied 1
Satisfied 2
Neutral 3
Dissatisfied 4
Very dissatisfied ..5

Q.17 How satisfied or dissatisfied are you with the following aspects of the interior of your dwelling?
PROBE FOR LEVEL e. Heating

Very satisfied 1
Satisfied 2
Neutral 3
Dissatisfied 4
Very dissatisfied ..5

Q.18 How satisfied or dissatisfied are you with the following aspects of the interior of your dwelling?
PROBE FOR LEVEL f. Indoor air quality

Very satisfied 1
Satisfied 2
Neutral 3
Dissatisfied 4
Very dissatisfied ..5

Q.19 How satisfied or dissatisfied are you with the following aspects of the interior of your dwelling? PROBE FOR LEVEL g. Safety and security of dwelling

Very satisfied 1
Satisfied 2
Neutral 3
Dissatisfied 4
Very dissatisfied ..5

Q.20 In general, how satisfied or dissatisfied are you with your present dwelling as a place to live? PROBE FOR LEVEL

Very satisfied 1
Satisfied 2
Neutral 3
Dissatisfied 4
Very dissatisfied ..5

Q.21 Many aspects of a person's neighbourhood contribute to their quality of life. We'd like to know what you think about the neighbourhood you live in.

HIT ENTER .. 1

Q.22 How satisfied or dissatisfied are you with the following aspects of your neighbourhood? PROBE FOR LEVEL a. Parks and green space

Very satisfied 1
Satisfied 2
Neutral 3
Dissatisfied 4
Very dissatisfied ..5

Q.23 How satisfied or dissatisfied are you with the following aspects of your neighbourhood? PROBE FOR LEVEL b. Amount of traffic

Very satisfied 1
Satisfied 2
Neutral 3
Dissatisfied 4
Very dissatisfied ..5

Q.24 How satisfied or dissatisfied are you with the following aspects of your neighbourhood? PROBE FOR LEVEL c. Recreation programs and facilities

Very satisfied 1
Satisfied 2
Neutral 3
Dissatisfied 4
Very dissatisfied ..5

Q.25 How satisfied or dissatisfied are you with the following aspects of your neighbourhood? PROBE FOR LEVEL d. Personal safety

Very satisfied 1
Satisfied 2
Neutral 3
Dissatisfied 4
Very dissatisfied ..5

Q.26 How satisfied or dissatisfied are you with the following aspects of your neighbourhood? PROBE FOR LEVEL e. Your neighbourhood as a whole

Very satisfied 1
Satisfied 2
Neutral 3
Dissatisfied 4
Very dissatisfied ..5

Q.27 Following are some statements about your experience with your housing.

HIT ENTER .. 1

Q.28 Do you agree or disagree that: PROBE FOR LEVEL a. You feel like you belong in this neighbourhood.

Strongly agree 1
Agree 2
Neither agree nor disagree ..3
Disagree 4
Strongly disagree 5

Q.29 Do you agree or disagree that: PROBE FOR LEVEL b. You are proud to tell people what neighbourhood you live in

Strongly agree 1
Agree 2
Neither agree nor disagree ..3
Disagree 4
Strongly disagree 5

Q.30 Do you agree or disagree that: PROBE FOR LEVEL c. You are proud to show your home to visitors

Strongly agree 1
Agree 2
Neither agree nor disagree ..3
Disagree 4
Strongly disagree 5

Q.31 Do you agree or disagree that: PROBE FOR LEVEL d. You feel like you can't stand to be at home sometimes

Strongly agree 1
Agree 2
Neither agree nor disagree ..3
Disagree 4
Strongly disagree 5

Q.32 Do you agree or disagree that: PROBE FOR LEVEL e. Your home provides a good location for you to live your life

Strongly agree 1
Agree 2
Neither agree nor disagree ..3
Disagree 4
Strongly disagree 5

Q.33 Do you agree or disagree that: PROBE FOR LEVEL f. You often worry about being forced to move out of your current home

Strongly agree 1
Agree 2
Neither agree nor disagree ..3
Disagree 4
Strongly disagree 5

Q.34 Do you agree or disagree that: PROBE FOR LEVEL g. Your home is a good reflection of who you are

Strongly agree 1
Agree 2
Neither agree nor disagree ..3
Disagree 4
Strongly disagree 5

Q.35 In general, how friendly are the people in your neighbourhood? Would you say they are: READ LIST EXCEPT FOR NEUTRAL AND DON'T KNOW

Very friendly 1
Friendly 2
NEUTRAL 3
Unfriendly 4
Very unfriendly ..5
DK 6

Q.36 How often do you talk with your neighbours? READ LIST IF NECESSARY

more than 2 times per week ..1
1 or 2 times per week 2
1 or 2 times per month 3
1 or 2 times every 6 months ..4
1 or 2 times per year 5
less often 6
never 7

Q.37 How often do you help any neighbour or ask for help from any neighbour for such things as borrowing tools or food, watching each other's houses while away, etc.?

more than 2 times per week ..1
1 or 2 times per week 2
1 or 2 times per month 3
1 or 2 times every 6 months ..4
1 or 2 times per year 5
less often 6
never 7

Q.38 How many hours per week, on average, do you spend doing housework inside the home? 99=DON'T KNOW

Number of hours doing housework ..____

Q.39 IF MORE THAN 00, How much of a strain is the housework for you? STRAIN CAN BE PHYSICAL, EMOTIONAL OR OTHER. READ LIST.

a great strain 1
quite a strain 2
a moderate strain 3
not much of a strain ..4
no strain at all 5

Q.40 Are you the primary caregiver for a pre-school child? PERSONAL, NOT PROFESSIONAL CAREGIVER.

Yes ..1
No 2

Q.41 IF YES, How much of a strain do you find caring for this child? STRAIN CAN BE PHYSICAL, EMOTIONAL OR OTHER. READ LIST.

a great strain 1
quite a strain 2
a moderate strain 3
not much of a strain ..4
no strain at all 5

Q.42 To help us understand the quality of life in a community, we like to find out how people have been feeling lately and to ask about their health in general. 20a. Compared to other people your age, would you say your health is: READ LIST

Excellent 1
Very good ..2
Good 3
Fair 4
Poor 5

Q.43 How satisfied are you with your health in general? Would you say you are: READ LIST

Very satisfied 1
Somewhat satisfied ..2
Not too satisfied 3
Not at all satisfied 4

Q.44 Now, to help us assess people's quality of life, we would like to know how you've been feeling over the past two weeks. How much of the time over the past two weeks have you felt downhearted and blue?

all of the time 1
most of the time 2
a good bit of the time ..3
some of the time 4
a little of the time 5
none of the time 6

Q.45 How much of the time over the past two weeks have you felt under a great deal of stress? READ LIST

always 1
very often 2
fairly often 3
sometimes 4
almost never ..5
never 6

Q.46 Is there someone in your family or a close friend that you can confide in or talk to freely about your problems? E.G. PERSONAL, FAMILY PROBLEMS, ETC.

Yes ..1
No 2

Q.47 Is there someone among your friends or in your family who can help you if you need it?

Yes ..1
No 2

Q.48 In general, how satisfied are you with your social activities? Are you: READ LIST

Very satisfied 1
Somewhat satisfied ..2
Not too satisfied 3
Not at all satisfied 4
DK 5

Q.49 Considering your current income, how difficult is it to meet your current shelter-related costs? READ LIST IF NECESSARY

Extremely difficult ...1
Somewhat difficult ..2
Not at all difficult 3
Relatively easy 4

Q.50 And now just a few questions so we can classify the data. These questions are for statistical purposes only, and will be anonymous and confidential. 26. RECORD GENDER

MALE 1
FEMALE ..2

Q.51 To which of the following age categories do you belong? READ LIST

18 to 24 years ..1
25 to 34 years ..2
35 to 44 years ..3
45 to 54 years ..4
55 to 64 years ..5
65 to 74 years ..6
75 or older 7
REFUSED 8

Q.52 What is your marital status? DO NOT READ LIST

MARRIED 1
LIVING WITH A PARTNER/COMMON LAW .. 2
WIDOWED 3
DIVORCED 4
SEPARATED 5
SINGLE (NEVER MARRIED) 6
OTHER (SPECIFY) 7
REFUSED 8

Q.53 What is the highest level of education you have completed? DO NOT READ LIST

LESS THAN GRADE 9 1
SOME HIGH SCHOOL 2
COMPLETED HIGH SCHOOL 3
SOME TRADES OR TECHNICAL TRAINING 4
COMPLETED TRADES OR TECHNICAL TRAINING .. 5
SOME UNIVERSITY 6
COMPLETED UNIVERSITY 7
SOME POST-GRADUATE EDUCATION 8
COMPLETED POSTGRADUATE EDUCATION 9
REFUSED 10

Q.54 Does any person who normally lives in your household have a physical disability?

Yes 1
No 2
Refused .. 3

Q.55 IF YES, Does your dwelling require modifications to help this person cope with their disability?

Yes 1
No 2
Refused .. 3

Q.56 31. Canadians belong to many ethnic or cultural groups, such as Scottish, French, Chinese, Inuit, etc. What is your family heritage? DO NOT READ, AS MANY AS APPLY.

ENGLISH 1
SCOTTISH 2
IRISH 3
OTHER BRITISH 4
CANADIAN 5
CHINESE 6
CROATIAN 7
DANISH 8
DUTCH (NETHERLANDS) 9
EAST INDIAN 10
FILIPINO 11
FINNISH 12
FRENCH 13
GERMAN 14
GREEK 15
HUNGARIAN 16
ITALIAN 17
JAPANESE 18
JEWISH 19
KOREAN 20
LEBANESE 21
NORWEGIAN 22
POLISH 23
PORTUGUESE 24
SPANISH 25
SWEDISH 26
UKRAINIAN 27
VIETNAMESE 28
YUGOSLAVIAN 29
OTHER (SPECIFY) 30
REFUSED 31
RUSSIAN 32
FIRST NATIONS/INUIT/ METIS .. 33
SCANDINAVIAN 34
SERBIAN 35
AUSTRALIAN 36
CZECHOSLOVAKIAN 37
IRANIAN 38
AUSTRIAN 39
AMERICAN 40
SRI LANKAN 41

Q.57 Sometimes the kind of work people do can contribute to their quality of life, too. In the next few questions, we would like to know a few things about your job. 32a. Are you presently employed?

Yes 1
No 2
Refused .. 3

Q.58 IF YES, Is that: READ LIST

full-time self-employed 1
part-time self-employed 2
full-time (but not self-employed) ...3
part-time (but not self-employed) ..4
REFUSED 5

Q.59 IF NOT EMPLOYED, Are you: READ LIST

laid off/unemployed ..1
retired 2
homemaker 3
full-time student 4
disabled 5
REFUSED 6

Q.60 IF EMPLOYED, What is your occupation or job title?

PROFESSIONAL/ TECHNICAL 1
MANAGER/OFFICIAL/ PROPRIETOR .. 2
SALES WORKER 3
CLERICAL WORKER 4
CRAFTSMAN/FOREMAN/ SKILLED 5
OPERATIVE (SEMISKILLED) 6
SERVICE WORKER 7
LABOURER 8
OTHER 9
REFUSED 10

Q.61 What is your main source of income for your household? ONE ANSWER, READ LIST IF NECESSARY.

Employment 1
Self-employment 2
Old age pension 3
Disability pension 4
Worker's compensation .. 5
Employment insurance .. 6
OTHER (SPECIFY) 7
DON'T KNOW 8
REFUSED 9
Scholarships 10
Student loan 11
Parents 12
Investments/Savings 13
Social assistance 14

Q.62 Considering all sources, was your total annual household income in 1998 under or over $40,000?

Under $40,000 1
$40,000 or more ..2
DK 3
REFUSED 4

Q.63 IF UNDER $40,000, READ CODES 1-6. IF $40,000 OR MORE, READ CODES 7-13. Is it:

less than $10,000 ... 1
$10,000 - $14,999 .. 2
$15,000 - $19,999 .. 3
$20,000 - $24,999 .. 4
$25,000 - $29,999 .. 5
$30,000 - $39,999 .. 6
$40,000 - $49,999 .. 7
$50,000 - $59,999 .. 8
$60,000 - $69,999 .. 9
$70,000 - $79,999 ..10
$80,000 - $89,999 ..11
$90,000 - $99,999 ..12
$100,000 or more ...13
DK 14
REFUSED 15

Q.64 IF DK ANNUAL INCOME IN Q.34b, Could you tell us your total household income for the last month? 9999=REFUSED, 9998=DK

Last month household income .._____

Q.65 What is the monthly rent you now pay for this dwelling?

dollars/month .. _____

Q.66 What are your monthly payments for each of the following? ENTER 0 IF THE PAYMENT IS INCLUDED IN THEIR MONTHLY RENTAL PAYMENT. a. Hydro/natural gas 99999=REFUSED, 99998=DK

$/month .. _____

Q.67 Do you have a separate bill for heating?

Yes ..1
No 2
DK ... 3

Q.68 IF YES, What are your monthly payments for heat?

$/month .. _____

Q.69 What are your monthly payments for parking? NOT APPLICABLE=88888

$/month .. _____

Q.70 What are your monthly payments for Cable TV service? NOT APPLICABLE=88888

$/month .. _____

Q.71 Is there a mortgage outstanding on this dwelling?

Yes 1
No 2
REFUSED .. 3

Q.72 What is your regular mortgage payment, not including property taxes? 99999=REFUSED, 99998=DON'T KNOW.

mortgage payment .._____

Q.73 How often is this payment made?

once a week 1
twice a month 2
once a month 3
every 6 months ..4
bi-weekly 5
REFUSED 6

Q.74 What is the amount of the principal outstanding on this dwelling? 9999999=REFUSED, 9999998=DK

Principal outstanding .._____

Q.75 What are your approximate total monthly payments for each of the following items? 99999=REFUSED, 99998=DK a. Property taxes, including school, municipal and any special real estate taxes.

Monthly property taxes .._____

Q.76 What are your monthly payments for hydro/natural gas? 99999=REFUSED, 99998=DK

$/month .. _____

Q.77 Do you have a separate bill for heating?

Yes .. 1
No 2
DK ... 3

Q.78 IF YES, What are your monthly payments for heat?

$/month .. _____

Q.79 What are your monthly payments for parking?

$/month .. _____

Q.80 What are your monthly payments for condominium fees? NOT APPLICABLE=88888

$/month .. _____

Q.81 What are your monthly payments for Cable TV service?

$/month .. _____

Q.82 What price did you pay for this dwelling when you first bought it?

Price when bought .. _____

Q.83 What is the estimated current market value of this dwelling?

Current market value .. _____

Q.84 Phone Number:

_____

APPENDIX B:

SUPPLEMENTARY TABLES

BIVARIATE RELATIONSHIPS BETWEEN HOUSING AND HEALTH - OWNERS							
EXPLANATORY VARIABLE (* p < .05; ** p < .01; *** p < .001)	**HEALTH STATUS**	**HEALTH SATISFAC.**	**MENTAL HEALTH**	**EXPLANATORY VARIABLE** (* p < .05; ** p < .01; *** p < .001)	**HEALTH STATUS**	**HEALTH SATISFAC.**	**MENTAL HEALTH**
age	** (4)			can't stand to be at home?	* (NG)	** (3)	
gender				home a good location for life?			
income	** (5)			worry about having to move?			
income adjusted for hhold size	** (4)			feel like you belong in hood?	* (3)	* (3)	
education	** (4)			proud of neighbourhood?	* (3)	* (3)	
marital status				proud of dwelling?	*** (3)	*** (4)	
ethnicity	* (g)			home reflects identity?	* (3)	*** (4)	
income source				exposure to sunlight		*** (NG)	
working status				noise from inside bldg		*** (NG)	
job class				noise from outside bldg	* (4)	** (4)	
disability	** (e)	** (e)	* (e)	amount of space		** (3)	
age of dwelling				heating		*** (3)	
dwelling type				indoor air quality	* (4)	*** (NG)	
no. of bedrooms				safety & security of dwelling		*** (3)	
housing tenure	n/a	n/a	n/a	overall dwelling satisfaction	* (NG)	* (3)	
dwelling in a strata council?	* (c)			dwelling score	** (4)	*** (3)	
dwelling part of a co-op?				parks and greenspace	** (NG)	* (3)	
household type			** (a)	amount of traffic		** (4)	
no. persons in hhld	* (NG)			recreation facilities	*** (3)	** (4)	
crowding index (brs/persons)				personal safety		** (4)	
length of residence in dwelling	* (5)			neighbourhood as a whole			
length of residence in 'hood				neighbourhood score	** (4)	** (NG)	
monthly housing expenditure				neighbourhood dummy variable	** (b)		
housing $$ as % of income				east or west side?		* (f)	
housing $$ as % of adj. income				how friendly are neighbours?	* (4)		
housing $$ > 30% adj. income?				talk with neighbours - frequency			
home equity				help to/from neighbours - freq	* (3)		
capital gains (owners only)				have a confidant?	* (d)	** (d)	* (d)
capital gains (renters = 0)				have someone to help?			
housing costs a strain?	** (4)	** (3)		satisfaction w/ social activities	*** (5)	*** (4)	
hours of housework (weekly)	** (NG)	* (3)					
strain of housework							
general stress (self-report)		* (NG)					

a. one adult alone ⇒ bad; couple with no kids; other ⇒ good.
b. Renfrew, Sunset, Downtown ⇒ bad; West End ⇒ good.
c. non-strata ⇒ bad.
d. no confidant ⇒ bad for health, health satisfaction, mental health.
e. have disability ⇒ poorer health.
f. East side ⇒ poorer health satisfaction.
g. non-Western descent ⇒ poorer self-rated health.

BIVARIATE RELATIONSHIPS BETWEEN HOUSING AND HEALTH - RENTERS							
EXPLANATORY VARIABLE (* p < .05; ** p < .01; *** p < .001)	**HEALTH STATUS**	**HEALTH SATISFAC.**	**MENTAL HEALTH**	**EXPLANATORY VARIABLE** (* p < .05; ** p < .01; *** p < .001)	**HEALTH STATUS**	**HEALTH SATISFAC.**	**MENTAL HEALTH**
age				can't stand to be at home?	** (NG)		** (5)
gender				home a good location for life?			
income	*** (4)	*** (3)	** (NG)	worry about having to move?	** (5)	* (4)	
income adjusted for hhold size	*** (4)	** (3)	* (NG)	feel like you belong in hood?		* (NG)	
education	** (4)	* (3)		proud of neighbourhood?			* (NG)
marital status			* (a)	proud of dwelling?	*** (4)	** (3)	*** (4)
ethnicity				home reflects identity?			
income source				exposure to sunlight	** (NG)		
working status	*** (b)	*** (b)		noise from inside bldg	* (4)		
job class			* (c)	noise from outside bldg		* (4)	
disability	*** (g)	*** (g)	* (g)	amount of space	* (4)		* (NG)
age of dwelling				heating		* (4)	
dwelling type				indoor air quality	** (4)	* (4)	** (5)
no. of bedrooms				safety & security of dwelling	* (5)		
housing tenure				overall dwelling satisfaction	*** (4)	** (4)	* (5)
dwelling in a strata council?				dwelling score	*** (4)	* (4)	* (4)
dwelling part of a co-op?				parks and greenspace	* (4)	* (3)	
household type				amount of traffic		** (3)	
no. persons in hhld				recreation facilities	* (NG)		
crowding index (brs/persons)				personal safety	*** (4)	** (3)	
length of residence in dwelling	* (4)			neighbourhood as a whole	** (4)	** (3)	** (3)
length of residence in 'hood	* (5)			neighbourhood score	*** (4)	** (4)	
monthly housing expenditure				neighbourhood dummy variable	** (d)		
housing $$ as % of income	* (4)	* (3)	* (4)	east or west side?	*** (h)	** (h)	
housing $$ as % of adj. income				how friendly are neighbours?			
housing $$ > 30% adj. income?	** (i)			talk with neighbours - frequency			* (NG)
home equity				help to/from neighbours - freq			
capital gains (owners only)				have a confidant?	* (e)		*** (e)
capital gains (renters = 0)				have someone to help?			*** (f)
housing costs a strain?			* (4)	satisfaction w/ social activities	*** (5)	*** (4)	*** (4)
hours of housework (weekly)	*** (5)	*** (4)	*** (4)				
strain of housework							
general stress (self-report)	* (5)	** (3)	*** (5)				

a. divorced/separated ⇒ poorer health.
b. laid off/unemployed, disabled ⇒ poorer health.
c. labourer, clerical, service, other ⇒ poorer health; operative (semiskilled) ⇒ better health.
d. Sunrise, Kensington, Sunset ⇒ poorer health.
e. no confidant ⇒ poorer health.
f. nobody to help if you need it ⇒ poorer health.
g. have disability ⇒ poorer health.
h. East side ⇒ poorer health.
i. housing costs > 30% ⇒ poorer health.