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Effects of Housing Circumstances on Health, Quality of Life and Health Care Use for People with Severe Mental Illness: A Review

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Executive Summary

Objective: Individuals with severe and persistent mental illness (SPMI) identify housing as an important factor in achieving and maintaining their health. However, many live in substandard accommodations that are physically inadequate, crowded, noisy and located in undesirable neighbourhoods. In much of the research on housing for persons with SPMI, the central outcome of interest is remaining housed; however, it is worth investigating whether housing has other benefits. This paper is a systematic review of studies that investigated the relationship between housing-related independent variables and health-related dependent variables.

Methods: Ten online databases were searched for studies published since 1980 that had study populations of adults with SPMI, analysed primary or secondary empirical data, and measured housing related independent variables and health related dependent variables. Clearly defined epidemiological criteria were used to assess the strength of evidence of the selected studies.

Results: Twenty-nine studies met the suitability criteria, of which fourteen reported health care utilization outcomes; twelve examined mental status outcomes; and nine reported quality of life outcomes.

Suggestions for Further Research: Although there is good evidence that housing interventions benefit the homeless population, more research is needed about housing solutions for individuals with SPMI who are housed, but in precarious or inappropriate housing situations. Study methodologies could be improved by emphasizing longitudinal designs that focus on participant retention and by implementing matched control groups or randomized interventions to strengthen internal validity.

Service and Policy Implications: Ensuring that a person is adequately housed upon discharge from hospital should be a treatment priority. When housing eligibility is not dependent on psychiatric treatment compliance and sobriety, providing permanent housing minimizes harm and may free people to voluntarily seek treatment. Housing that offers an unlimited length of stay is recommended because SPMI is a chronic and fluctuating condition that requires stable surroundings to maintain health.

Key Words: severe and persistent mental illness, housing, health care utilization, quality of life, mental health status

Introduction

With the near-total transformation of long-term psychiatric care from an institutional setting to the community, the importance of stable, affordable and adequate housing to meet the needs of individuals with severe and persistent mental illness (SPMI) has grown. In fact, individuals with SPMI frequently identify income and housing as the most important factors in achieving and maintaining their health (Trainor, Pomeroy & Pape, 1999). Housing is a stabilizing force in everyday life, which forms the foundation on which a person can establish a daily routine and begin to address other life issues (Trainor et al., 1999). However, due to low incomes, stigma, difficulties in daily functioning inherent to SPMI, and fluctuations in symptoms, persons with SPMI generally cannot compete for market rental housing, or gain entry to scarce social and supported housing units. Consequently, many live in substandard accommodations that are physically inadequate, crowded, noisy, and located in undesirable neighbourhoods (Kirby & Keon, 2006). The challenge of providing stable housing options for persons with SPMI is reflected in the estimated 45% of homeless persons in the United States who have experienced mental health problems in the past year and the 31% who have experienced mental health and substance abuse problems (Burt et al., 2001). Among single adults in Toronto who are homeless for the first time, 67% have a lifetime history of mental illness and 68% have a lifetime history of substance abuse/dependence (Goering et al., 2002).

Traditionally, the institution – community interface has been conceptualized using a “Continuum of Care” (COC) ideal type model, whereby people with SPMI are expected to pass through successive stages and types of accommodation (from the street or institutional living to permanent supported housing). At each stage, clients must demonstrate ‘housing readiness’, which often means being sober and complying with psychiatric treatment (Tsemberis et al., 2004). Evaluations of innovative “Housing First” initiatives, however, are now appearing in the literature (Tsemberis et al., 2004). The Housing First model rejects the logic of housing readiness in the COC model, instead promoting the position that stable housing is, for many people with SPMI, a precondition to participating successfully in psychiatric treatment and dealing with addictions. The Canadian Mental Health Association (CMHA) expands on this concept in its Framework of Support policy model to say that people with SPMI, like everyone else, need good housing in order to participate fully in the community. Housing is considered to be a fundamental human right and an important social determinant of health for all citizens (Trainor, et al., 1999).

In considering the evidence on the effect of housing on health and quality of life for people with SPMI, we use the term housing in a very broad sense. In other words, we intend the term to include the binary distinction between ‘housed and not-housed’ as well as notions of social and emotional aspects of the home. Indeed, based on previous theoretical and empirical research, it is likely that merely having shelter is a necessary but insufficient condition for maintaining stable

housing, in order for people with SPMI or anyone else for that matter to be successfully housed, they must also have some experience of home. (Kearns & Smith, 1994; Somerville, 1992).

In much of the research on housing for people with SPMI, the central outcome of interest is remaining housed, reflecting the COC model. Based on the self-reports of people with SPMI, however, it is worth investigating whether housing has other benefits, for example on health, quality of life and utilization of health care and other services. Consequently, in this review we focus exclusively on the impact of housing on health-related outcomes, reflecting in part the Housing First philosophy.

This paper is a systematic review of published empirical studies that investigated the relationship between housing-related independent variables and health-related dependent variables. Clearly defined epidemiological criteria were used to assess the strength of evidence of the selected studies. The reviewed studies span a 25 year time period, are methodologically diverse and variable in quality. With the recent research on “Housing First” initiatives, there is an emerging recognition of the primacy of housing for the recovery and health maintenance of persons with SPMI.

Methods

Ten online databases were searched (PubMed, PsychINFO, CINAHL, OVID HealthStar, Embase, Allied and Complementary Medicine, Social Sciences Citation Index, Social Sciences Abstracts, Sociological Abstracts, and Social Work Abstracts) for articles published since 1980 using terms describing SPMI (mental disorders, mentally ill persons) and housing circumstances (housing, residential, living arrangements, home environment, and independent living). To be considered for the review, the study had to satisfy the following criteria: a study population of adults (18-64 years old) with SPMI, a study design that involved the analysis of primary or secondary empirical data, housing related independent variables, and health related dependent variables, including health care utilization, health status, and quality of life (Newman, 2001). Studies that gathered solely qualitative data were excluded. The strength of evidence for each study was assessed using criteria that were adapted from a review by Thomson et al. (2001). The terms accompanying the strength of evidence ratings are not intended to be pejorative, but simply to reflect a study's ability to support causal inferences. All of the reviewed studies make an important contribution to the knowledge base on the topic of housing and health for persons with SPMI.

The strength of evidence criteria used in the review are as follows:

1 Very Weak: Typically cross-sectional studies with no adjustment for confounding variables; biased measurement of health outcomes;

2 Weak: Cross-sectional studies with a control group and/or adjustment for confounding; prospective and retrospective studies with limited or no adjustment for confounding; appropriate measurement of health-related outcomes;

3 Medium: Prospective and retrospective studies with >80% follow-up for >= 6 months; some adjustment for confounding; appropriate measurement of health outcomes

4 Medium Plus: Prospective study with control group and >80% follow-up for >= 6 months; some adjustment for confounding; appropriate measurement of health outcomes

5 Strong: Prospective study with >80% follow-up for >= 6 months; randomized controlled trial or controlled study with comparable control group; objective measurement of health outcomes.

Results

Twenty-nine studies met the suitability criteria and were assessed for strength of evidence (see Tables 1 - 3). The key findings are described by type of outcome variable.

A. Housing and Health Care Utilization

Table 1 summarizes the key features of the thirteen studies that reported health care utilization outcomes. Three of these studies received strong evidence ratings because they incorporated control groups and had follow-up rates of greater than 80% for a minimum of 18 months (Culhane et al., 2002; Dickey et al., 1996; Hodgins et al., 1990). The ten remaining studies received medium or weak strength of evidence ratings. The nine studies that did not include a control group, collected longitudinal data (seven prospectively and two retrospectively) and follow-up times varied from five months to ten years. Study participants' ages ranged from a mean of 33 to 49 years and the percentage of males in the samples ranged from 43% to 71%. Schizophrenia was the predominant diagnosis with sample percentages ranging from 53% to 100%.

The majority of studies in this section measured participants' hospital use before and after a housing intervention. In Ontario, 34 supportive housing residents reduced their mean pre-intervention hospitalization time of 53.4 days per year to 0.53 days in the following year (McCarthy & Nelson, 1991). The mean hospitalization time for 74 study participants in their first year of living in nine Chicago community integrated living facilities was 5.3 days compared to 47.7 days in the baseline year and this time was the same whether residents lived in intermittent or continuous care housing (Hanrahan et al., 2001). In a Copenhagen study of 47 new group

home residents, their mean hospitalization index (a ratio of full or partial days hospitalized over total days in a given period) in the year after entering the group homes was significantly lower (t=2.54, p=0.05) than the hospitalization index of the baseline year (Middelboe, 1997). These three cohort studies had weak to medium strength of evidence because they did not incorporate a control group. Despite this study limitation, the finding of reduced time spent in hospital after a housing placement is a promising one that warrants further exploration using more rigorous research designs.

The studies that examined the hospital use over time of persons with SPMI who were housed had medium strength of evidence. A ten year study examined the relationship between length of housing tenure and health care utilization in a representative sample (n=393) of adults with SPMI living in sheltered care homes in California (Segal & Kotler, 1993). The 41% of the sample that was admitted to hospital for psychiatric reasons during the ten-year study had more frequent admissions (5.6 versus 2.8) during that time (1973-1983) than prior to it (1963-1973), but mean length of stay per episode was shorter (37 versus 788 days). A three-year longitudinal study of 269 individuals with connections to the mental health system and living in two housing subsidy programs in Baltimore and Hamilton County also analyzed the relationships between housing variables and hospital utilization (Newman et al., 1994). This study was unique in its calculation of rent burden (total housing costs to income ratio) as an independent variable. The investigators found that a lower rent burden (other factors held constant) was significantly associated with fewer days spent in hospital per month, although the number of hospital admissions did not vary (Newman et al., 1994). Also looking at living arrangements and rehospitalization were Blumenthal et al. (1982) who found that living arrangements accounted for less than 0.01% of the variance in length of time to rehospitalization while previous hospitalizations accounted for 5.8%.

Three studies compared the hospital utilization of individuals with SPMI placed in housing to that of a control group (Culhane et al., 2002; Hodgins et al., 1990; Lipton et al., 1988). Forty-nine homeless mentally ill patients, selected at psychiatric hospital admission, were randomly assigned to an experimental residential treatment program or to standard post discharge care and followed for one year (Lipton et al., 1988). Although this study used a control group, its objective of comparing a housing intervention with standard community based care was confounded by the controls' very long index hospitalizations. This limitation, in addition to a small sample size and lower follow-up rate (69%), results in a weak strength of evidence rating for this study.

A New York study measured hospital utilization for two years pre- and post-housing placement for an intervention group of formerly homeless persons with SPMI and a matched control group living in homeless shelters (Culhane et al., 2002). When they compared inpatient state psychiatric hospital use of participants placed in housing and their matched controls, they found that, holding other factors constant, a housing placement in New York City was associated with

a reduction of 28.2 hospital days over two years, reflecting a 49.2% decrease in state psychiatric hospital utilization per housing placement. Incorporating the changes in utilization of seven different public services by study participants before and after a New York housing placement, the results indicated that 95% of the housing costs were offset by service reductions attributable to the housing placements (Culhane et al., 2002). There is strong evidence for this finding because the study had a large sample size, used a matched control group, had lengthy follow-up and analyzed the data using multi-variate regression techniques.

Former psychiatric inpatients in Montreal placed in single apartments designated for persons with SPMI (n=61) or on the waiting list for apartments (matched control group, n=51) showed no significant differences in hospital readmission rates, length of hospital stay, or emergency room visits over a 24-month period (Hodgins et al., 1990). The authors expected to see differences in service use, but instead found that the intervention group showed significantly more thought disorder than the control group at 12, 18, and 24 months. The stress of living in a poorly supervised building designated for tenants with SPMI was the suggested explanation for the unexpected result (Hodgins et al., 1990). A strong study design was used, so the research warrants repeating with other supervised apartments.

The relationship between housing stability and hospital utilization was explored in several studies, which varied in setting, rigor and definitions of housing stability. Housing stability, in urban Cambridge U.S.A. (n=187), was the degree of participants' homelessness in the past 6 months. Participants who were predominantly homeless during the year had a rehospitalization rate of 75% compared to 47% for the occasionally homeless and 35% for participants who were predominantly housed (Drake et al., 1989). In rural New England (n=75), housing stability was measured on a scale from highly supportive (stable) to highly stressful or tenuous (unstable) living arrangements. No differences in one-year rehospitalization rates were found by housing stability, however, the unstably housed participants were somewhat more likely to be jailed and significantly more likely to be literally homeless (Drake et al., 1991). A one-year New York study of 119 newly discharged inpatients found that those who moved at three months were not more likely to be rehospitalized than those who did not move at three months (Caton & Goldstein, 1984). When 112 previously homeless individuals were randomly assigned to one of two housing placements in Boston, participants who did not move in the 18-month follow-up period (regardless of housing type) had a significantly lower annual mean number of days in hospital compared to those who did move during the study (Dickey et al., 1996).

Section A Summary:

The beneficial effect of housing interventions on hospital use for persons with SPMI not identified as being homeless has a weak evidence base. Studies involving this population tend to be prospective cohort studies and rarely include a control group. In several studies, the mean

number of days hospitalized in the year following a housing intervention (a housing placement) was significantly lower than the mean in the preceding year (Hanrahan et al., 2001; McCarthy & Nelson, 1991; Middelboe, 1997). Other cohort studies showed that stable (Segal & Kotler, 1993) and affordable (Newman et al., 1994) housing significantly reduced length of hospitalizations although the number of hospital admissions remained the same. These are promising findings that warrant further study with stronger research designs.

The beneficial effect of providing housing to formerly homeless persons with SPMI on their hospital use has a good evidence base. Studies involving this population tend to have strong study designs such as randomized controlled trials (Dickey et al., 1996) and cohort studies with matched control groups (Culhane et al., 2002). Two such studies found that a housing placement is related to reduced hospital admissions and fewer days hospitalized for formerly homeless persons with SPMI and that length of time in housing rather than type of housing appears to be the key factor (Culhane et al., 2002; Dickey et al., 1996). A cost-benefit analysis showed that 95% of housing costs were offset by service reductions attributable to the housing placements (Culhane et al., 2002).

The studies that measured hospital use have provided ample evidence for planning housing interventions for homeless persons with SPMI in the USA. Further research in this area should focus on testing these interventions in other countries. The types of outcome measures should expand to include quality of life, cost-benefit calculations and other public service use such as community health centres and prisons (Culhane et al., 2002). More research is needed about housing solutions for individuals with SPMI who are housed, but in precarious or inappropriate housing situations. Within and between jurisdictions, the consistent use of common definitions and measures of housing factors and health outcomes would facilitate study comparisons and allow for meta-analyses.

B. Housing and Mental Status Outcomes

This section describes the studies that examined mental status (psychiatric symptoms) as an outcome variable. There were three cross-sectional studies, five prospective cohort studies, three quasi-experimental studies, and one randomized controlled trial. The participants' mean ages ranged from 33 to 50 years and the percentage of males varied from 30% to 79%, with two studies having predominantly female samples. Schizophrenia and other psychoses were the main diagnoses, but five studies did not report illness characteristics. Although only two studies were rated as having findings with strong evidence, many of the studies with weaker designs showed promising findings.

The evidence for a relationship between housing type and mental status outcomes was rated as very weak to weak (Browne & Courtney, 2004; Nelson et al., 1999), except in one study

(Seidman et al., 2003). In an Australian study (n=3231), boarding home residents with schizophrenia had significantly higher problem severity scores than residents with schizophrenia living in private homes (Browne & Courtney, 2004). Because the data were cross-sectional and the analysis did not adjust for potentially confounding variables such as illness severity or length of residence, the validity of the results is limited. In Ontario, residents of group homes and supportive apartments reported lower levels of emotional well-being (lower positive affect and higher negative affect scores) than residents of BCHs (Nelson, 1999). This finding was unexpected because BCH tend to be more crowded, less physically comfortable, and offer less privacy than GH or SA. The authors suggested that the difference between groups might have been due to selection factors (BCH residents were older and had lived longer in their homes) rather than to type of housing. Stronger evidence was found for the results of a Boston randomized controlled trial, in which 114 persons with SPMI living in homeless shelters were randomly assigned to independent apartments or group homes and followed for 18 months. Total neuropsychological functioning (attention, executive functions, verbal memory and general intellectual functioning) improved significantly for both groups. On its own, executive functioning, which is a set of cognitive abilities that control and regulate other abilities and behaviours (measured by the Wisconsin Card sorting test), decreased significantly for the independent apartments group (Seidman et al., 2003). The authors speculated that executive functioning decreased in the apartment residents because living alone did not provide the social structure and interaction that was present in the homeless shelters and retained in the group homes.

Several studies looked at housing quality. A Canadian study (n=89) found that the variable 'number of resident housing concerns' (their perceptions of housing comfort and quality) interacted with social network size in its relationship with positive and negative affect (Earls & Nelson, 1988). Specifically, for participants reporting a high level of housing concerns, a large network size was associated with a high level of positive affect (feelings of emotional well-being) and a small network was associated with high levels of negative affect (feelings of anxiety, anger and/or depression). Another Canadian study found that having housing concerns at baseline predicted negative affect one year later, controlling for demographic variables and prior negative affect (Nelson et al., 1998). Despite the weak strength of evidence for the findings of these two studies, the results are promising. Improving housing quality is a tangible intervention that could have a lasting effect on residents' mental status.

An American study (n=124) included neighbourhood conditions and a home's social environment in its examination of housing quality (Davies et al., 1989). It found that adverse neighbourhood conditions rather than housing conditions were related to increasing symptoms of anxiety and depression, adjusting for urban/rural location. Greater household conflict was also related to more symptoms of anxiety and depression, independent of location.(Davies et al., 1989). Not having ones own room at baseline was also positively related to negative affect at one year (Nelson et al., 1998). The results regarding a home's social environment are

promising, despite the weak evidence. Previous research has shown that having one's own room is very important to residents (Goering et al., 1997; Massey & Wu, 1993); Nelson et al. (1998) provide empirical evidence to support this preference.

Studies that examined housing stability, defined it as housing status (housed or not), length of time in housing, and types of housing moves. In a 12-month study (n=548) of the service using homeless population in California, the SPMI subgroup (n=98) experienced a large reduction in psychological distress symptoms over time; however, this reduction was not associated with housing status at follow up (Wong, 2002). In a ten year study (n=393) of BCH residents in California, psychiatric symptoms decreased significantly over time, but independent functioning worsened, controlling for aging (Segal, 1993). This shows that housing stability is beneficial, but that type of housing (such as BCHs) can have some negative consequences. Kearns and Smith (1994) analyzed the housing moves of 203 New Zealanders with SPMI in relation to their well-being (measured using a subscale of the modified Social Adjustment Scale: SAS-M). Three housing moves (moving from a rehabilitation hostel to a flat, moving from a rehabilitation hostel to a house, and moving from a house to a flat) accounted for 30% of the explained variance in positive change on the SAS-M scale. The moves would likely have resulted in the individuals living in a smaller household (number of people), which may have allowed for more privacy and fewer instances of interpersonal conflict (Kearns & Smith, 1994). These results show promise for the importance of interventions that change the housing circumstances of persons with SPMI who are currently housed .

Five studies measured mental status outcomes after a housing intervention. Depp et al.(1986) examined the effects of providing access to a housing subsidy upon hospital discharge, but the results are not robust due to the very low participant follow-up rate of 41%. A Copenhagen study (n=47) found that individuals with SPMI placed in group homes had significantly lower psychiatric symptom scores after one year, but without comparison to a control group, we cannot be sure that it was the housing intervention that led to the improvement (Middelboe, 1997). The three intervention studies that incorporated a control group had stronger evidence for their results.

A Montreal quasi-experimental study compared former psychiatric inpatients placed in single apartments designated for persons with SPMI (n=61) with a matched control group (n=51) on the waiting list for apartments. The intervention group showed significantly more thought disorder than the control group at 12, 18, and 24 months. (Hodgins et al., 1990). A 12-month quasi-experimental study in Florida compared the effectiveness of a comprehensive housing program (offering guaranteed access to housing and case management) or case management alone in reducing homelessness among persons with SPMI (Clark & Rich, 2003). Highly impaired individuals had higher gains in stable housing with the comprehensive housing program while individuals with low and medium levels of impairment did just as well with case

management alone. This study would be strengthened by random allocation to service type and longer follow-up times.

In a 24-month New York study, 208 participants were randomly assigned to a Housing First program, which offered immediate housing without expectation of psychiatric treatment compliance and sobriety or to a Continuum of Care type program (control), which offered transitional housing that required psychiatric treatment compliance and sobriety (Tsemberis et al., 2004). Repeated measures analysis showed no significant differences in psychiatric symptoms or alcohol and drug use between groups by time period. The intervention group did not experience higher levels of psychiatric symptoms than their peers living in housing that required them to be in treatment (Tsemberis et al., 2004). These study results challenge the practice of linking housing eligibility with psychiatric treatment compliance and sobriety (Tsemberis et al., 2004).

Section B Summary:

Many of the studies in this section present promising results to inform policy; however, they vary so much in study type, variables measured and measurement tools that more research is needed to confirm the findings. When formerly homeless individuals with SPMI were housed, their mental status outcomes were similar whether they participated in treatment or not (Tsemberis et al., 2004) and overall neuropsychological function improved regardless of housing type (Seidman et al., 2003). Yet executive functioning by itself decreased for independent apartment residents (Seidman et al., 2003). These results suggest that homeless persons with SPMI do not need a particular type of housing so much as housing that is long-term. In addition, a broad range of community services to support independent functioning and address treatment needs should be available. In studies of housing interventions for individuals with SPMI not identified as being homeless, intensity of services required varied with level of patient impairment (Clark et al., 2003) and poorly delivered housing programs had detrimental effects on mental health (Hodgins et al., 1990). A housing intervention that maintains or improves the housing circumstances of individuals with SPMI, however, may contribute to a reduction of psychiatric symptoms (Middelboe, 1997) and an increased sense of well-being (Kearns & Smith, 1994). Studies on the mental health effects of housing quality (structural and social environment) show promising findings, but have weak evidence (Earls & Nelson, 1988; Nelson et al., 1998). Number of resident concerns about housing quality, not having one's own room and household conflict are all associated with increasing symptoms of anxiety, anger

and/or depression (Davies et al., 1989; Nelson et al., 1998). These results suggest that interventions to improve housing quality could positively affect residents' mental health.

C. Housing and Quality of Life

Numerous studies on housing for people with SPMI show promising findings for policy – a small number of identifiable characteristics seem to be associated with better outcomes. But when judged against a very high standard of scientific quality of evidence, the reliability of the findings is questioned. Many of the studies described in this section are weak in design, but have promising findings, suggesting a need for further research with greater attention to study quality and rigour.

This section focuses on the seven studies in Table 3 and two studies in Table 1 that reported quality of life outcomes. Apart from one randomized controlled trial with strong support for its findings, these studies reported findings with very weak to medium strength of evidence. There were three cross-sectional studies (one with a matched control group) and five prospective cohort studies (no control groups) with follow-up times ranging from nine months to eleven years. The mean ages of the study participants ranged from 33 to 58 years. Males made up the majority of participants (53% to 94%) in all but one sample (44%). Schizophrenia was the predominant diagnosis (57% to 79%) in the five studies that reported illness characteristics.

In some studies, it was difficult to ascertain what effects housing had on quality of life because the housing variables were not clearly defined (Middelboe, 1997; Okin & Pearsall, 1993). In Copenhagen, for example, residents' mean quality of life scores increased significantly after one year in group homes (Middelboe, 1997). A reduction in psychiatric symptoms and an increase in social integration explained 44% of the variance but the regression model did not include any specific housing related variables such as number of group home residents or amount of supervision (Middelboe, 1997). In contrast, an American study of 115 persons with SPMI living in supported housing examined housing choice with very clearly defined variables such as importance of choice, number of options and overall amount of perceived choice (Srebnik et al., 1996). A greater amount of perceived choice was positively correlated with life satisfaction ratings one year later and the importance of having choice was negatively correlated with life satisfaction one year later. However, when regression analysis controlled for initial levels of life satisfaction, the housing choice variables did not contribute significantly to life satisfaction at one year.

Quality of life outcomes were mixed for studies examining housing type as the independent variable. A British study with very weak evidence found that ratings of well-being did not differ among 61 residents living in halfway houses, boarding homes or group homes (Oliver & Mohamad, 1992). A Canadian study (n=107) with weak evidence found that residents living in

board and care homes (BCH) had higher total life satisfaction scores than residents of supportive apartments (SA) or group homes (GH) (Nelson et al., 1997). This finding was unexpected because BCH tend to be a less desirable housing option than GH or SA. The authors suggested that the difference between groups might have been due to selection factors (BCH residents were older and had lived longer in their homes) rather than to housing characteristics. In another Ontario study with weak evidence, there was no difference in mean quality of life scores between persons with SPMI living in supportive housing and those in BCHs (Aubry & Myner, 1996). This study also compared the quality of life of 51 community dwelling persons with SPMI with that of 51 community residents without SPMI in the same neighbourhood. Adjusting for physical, social and psychological integration, community residents (who lived in single homes, duplexes, row houses and apartments) had a significantly higher mean quality of life score than the persons with SPMI (who lived in housing with 9 to 124 other residents) (Aubry & Myner, 1996). In the only randomized controlled trial to measure quality of life outcomes, life satisfaction of previously homeless individuals (n=112) was unrelated to housing type (supervised group homes or independent apartments) and a housing intervention was not associated with a change in life satisfaction (Schutt et al., 1997).

Two cross-sectional studies with weak evidence (Mares et al., 2002; Nelson et al., 1995) and one cohort study with medium strength of evidence (Baker & Douglas, 1990) investigated the relationship between housing environment and quality of life. A California study of 162 veterans with SPMI living in BCHs found that perceived conflict at home was negatively associated with general well-being, adjusting for individual characteristics, facility attractiveness, and size (Mares et al., 2002). In an Ontario study of 111 residents with SPMI, total life satisfaction decreased as the number of resident concerns about housing comfort and quality increased, adjusting for self mastery and meaningful activity (Nelson et al., 1995). In New York State, case managers rated the residences of 844 persons with SPMI in terms of physical condition, adequacy for basic life activities, and overall appropriateness. Appropriateness was defined as the degree to which a residence matched a client's particular needs and functional capacities (Baker & Douglas, 1990). Adjusting for service utilization, only residence appropriateness was significantly related to change in clients' perceived quality of life over nine-months. Specifically, clients moving from appropriate to inappropriate residential settings showed a significant deterioration in perceived quality of life (Baker & Douglas, 1990).

Section C Summary:

According to this review's strength of evidence scale, less than half of the studies in this section produced findings supported by medium or stronger evidence. There is strong evidence for the finding that life satisfaction is unrelated to housing type for previously homeless people with SPMI. This mirrors the finding in Section A that hospital utilization does not vary with housing

type for the same population. These findings suggest that housing types are broad classifications that are not as informative as the specific factors that characterize a housing type. Future research should focus on more discrete variables such as amount of supervision and residence size. A promising finding with medium support is that the amount of perceived choice of housing correlates positively with residents' happiness and life satisfaction over time (Srebnik et al., 1995). This study warrants replication with a control group and a larger sample that would support multivariate data analysis. A weak but promising finding is that life satisfaction is negatively associated with the number of concerns about housing quality and comfort. It would be useful to test interventions that could address resident housing concerns and to measure their effects on residents' subsequent life satisfaction. The finding that quality of life deteriorates for individuals when they move from housing that is appropriate for their needs and capacities to that which is inappropriate seems obvious but also raises some questions. What circumstances prompted the housing move? Was the resident an active participant in the decision and what options were available? This scenario could arise in a system that follows the COC model. An individual may be forced to leave supportive housing for independent housing, even if such a change would remove the resident from the very environment that enabled him to cope and ultimately thrive.

Discussion

Suggestions for Further Research:

Research to date has illuminated some important associations between attributes of housing and health outcomes, but more research is needed to clarify and explain the links. The strongest evidence of the effect of housing on the health of people with SPMI comes from studies with people who were once homeless. It is unsurprising that the effects of housing are most visible in this group. The remainder of the evidence on housing attributes and health outcomes for people with SPMI is generally of poor quality in terms of study designs, is inconsistent in its definitions and measures and gives very little guidance as to what works and what doesn’t in terms of housing programs for people with SPMI.

Although there is some evidence that housing interventions aimed at homeless people are beneficial, more research is required in a number of areas. First, there is still little known about the impacts of housing solutions for individuals with SPMI who are housed, but in precarious or inappropriate housing situations. There is evidence that housing insecurity and frequent mobility is associated with poorer outcomes, but it remains to be seen whether housing interventions for SPMI can redress this.

Another shortcoming of the existing research is its inability to speak to the diversity of individual factors that affect housing needs and the likely efficacy of housing in improving health and

quality of life. In North America and elsewhere, housing research must reflect the diversity of persons with mental health problems including those with different diagnoses and levels of illness severity, seniors, new immigrants, indigenous populations, and rural residents.

A third issue concerns the presentation of research knowledge on housing for people with SPMI in a manner that can be used for decision-making. While arguments for increasing the quality and supply of supportive housing for people with SPMI should be made on the basis of rights to housing for all individuals, the effects that housing may have on important outcomes may be valuable in making the case for decisions. As such, research is needed that estimates the potential cost savings that occur as a result of people with SPMI having stable, affordable, and well-supported housing. The costs of a broad range of health and social services such as urgent care, family physicians, community mental health services, prisons and criminal justice, day support, vocational programs, and the care giving and material supports provided by family members should be considered in this regard.

In terms of methodology in this area of research, future studies could be improved in a number of ways. According to Newman (2001), the research on housing and mental illness is under-theorized, employs inconsistent and inadequate measurements and most studies have weak designs. Regarding the last of these points, the adoption of longitudinal designs that focus on participant retention and implementation of matched control groups would strengthen internal validity. Stronger evidence would result from statistical analyses that adjust for potentially confounding variables such as illness severity, receipt of psychiatric treatment and social support. Indeed, it is important to employ designs that allow for the effect of housing, independent of other interventions (e.g., support services) on health and quality of life outcomes (Newman 2001). This field of research would also benefit from replacing or enhancing ‘black-box studies’ of the effect of housing changes with studies that also measure changes in specific housing attributes in order to elucidate the mechanisms of the housing and health relationship. Whereas well designed quantitative studies provide generalizable information about groups of people, they are unable to capture the richness and uniqueness of individuals’ viewpoints. Qualitative methods could be used to more fully understand individuals' lived experiences of different housing arrangements. Within and between jurisdictions, the consistent use of common definitions and measures of housing factors and health outcomes would facilitate study comparisons and allow for meta-analyses. Newman (2001) goes so far as to recommend the establishment of a common set of measures for housing as an input and an outcome, which although an excellent idea, may be difficult to implement.

Service and Policy Implications:

The evidence reviewed in this paper suggests a number of service and policy directions. A housing intervention that maintains or improves the housing circumstances of individuals with

SPMI may contribute to a reduction of psychiatric symptoms and an increased sense of well-being. Ensuring that a person is adequately housed upon discharge from hospital should be a treatment priority. Housing is not a side issue to be addressed once an individual is stabilized on medication, but rather considered in the initial psychiatric assessment and treatment planning. In fact, stable housing circumstances may be a cornerstone of successful treatment, enabling persons with SPMI to transfer their focus from merely surviving to seeking growth opportunities such as life skills programs or addictions treatment. When housing eligibility is not dependent on psychiatric treatment compliance and sobriety, providing permanent housing minimizes harm and may free people to voluntarily seek treatment. This is especially important because the so-called 'hard-to-house' may be so because of their inability to conform to overly restrictive housing models based on housing readiness, sobriety and treatment compliance.

Relatively strong evidence shows that length of tenure in housing is significantly associated with reduced hospital utilization among formerly homeless persons with SPMI. Weak but promising evidence shows similar reductions in length of hospital stays for persons with SPMI who are in stable and affordable housing. These findings suggest that permanent housing, which is a key tenet in the supported housing model, should be the norm for this population. Individuals with SPMI should not have to worry about losing their housing when hospitalized for a lengthy period or when their symptoms remit and their functioning improves. SPMI is a chronic and fluctuating condition that requires stable surroundings to maintain health. Streamlining the processes for accessing a variety of services such as income support, housing programs, community living supports, and vocational programs should be done. For example, persons who qualify for long term income support should not have to go through a second process to qualify for subsidized housing.

Providing permanent, affordable housing would be a huge step toward improving the quality of life of persons with SPMI. It is not the only step, however. Persons with SPMI also require housing that is appropriate for their individual needs (Baker & Douglas, 1990) and support services that are individualized and flexible (Goering et al., 1997). Many persons with SPMI would prefer to live alone in single occupancy suites (Massey & Wu, 1993; Owen et al., 1996; Schutt & Goldfinger, 1996). This knowledge coupled with the weak but promising evidence that household conflict may be related to increased psychiatric symptoms (Davies et al., 1989; Mares et al., 2002) suggests that individuals with SPMI should not be required to live with a roommate. Individuals with SPMI can live successfully in the community with appropriate housing and adequate support (Ogilvie, 1997). It follows that public policy should promote success by ensuring that all of the necessary supports are in place.

List of Tables

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Glossary

Custodial Housing: The provider offers housing as a for-profit business. In house staff care for residents' basic needs of food, cleaning and medication management but do no offer rehabilitative services (Parkinson, Nelson & Horgan, 1999). Examples are board and care homes (BCH), boarding houses (BH) and single room occupancy hotels (SRO).

Supportive Housing: This model offers a continuum of residential facilities managed by not-for-profit agencies. The facilities offer varying levels of supervision and social support and residents are often required to be in outpatient treatment. Individuals stay in each setting for a limited time and are expected to move up the continuum to independent housing (Parkinson et al., 1999). Examples are group homes (GH), halfway house, community integrated living apartments (CIL) and supervised apartments.

Supported housing: This is non-segregated housing managed by a not-for-profit agency. Residents have control over where they live and who their living companions are. Participating in psychiatric treatment is not a requirement and any support services are provided by an outside agency (Parkinson et al., 1999). An example is individual or independent apartments (IA).

Roommate: One of two or more persons occupying the same suite or flat, but not sharing the same bedroom.

Executive Functioning: A set of cognitive abilities that control and regulate other abilities and behaviours. They include the ability to initiate and stop actions, to monitor and change behaviour, and to plan future behaviour. (Accessed on August 9, 2006 from http://www.minddisorders.com/Del-Fi/Executive-function.html)

TABLE 1: STUDIES OF HOUSING AND HEALTH CARE UTILIZATION

Lead Author, Location	Study Type Housing Type	Study Length (months)	Rate of follow-up	Sample Size	Control Group	Sample Characteristics (Study group/controls)	Adjusted for con founding	Strength of Evidence	Main Results
Drake et al, 1989; Cambridge, USA	Prospective cohort	12 m	Not reported	N=187	No	Mean age=40; Percent male 55; 71% psychotic illness	No	2	Predominantly Homeless significantly more likely (75%) than Occasionally Homeless (47%) and Stablely Housed (35%) to be rehospitalized but no differences in total hospital nights.
Lipton et al. 1988; New York City, USA	Randomized controlled trial	12 m	69%	N=26	C=23	Mean age=37; Percent male 65	No	2	The housing placement group spent significantly less time in psychiatric hospital (15% of one year) compared to control group (46% of one year)
McCarthy et al, 1991; Ontario, Canada	Prospective cohort; supportive housing	At least 5 m	Not reported	N=34	No	Mean age=35; Percent male 71 Schizophrenia 55%	No	2	After one year in supportive housing, residents' mean time in hospital (0.53 days) was significantly less than the year prior to supportive housing (53.4 days).
Blumenthal et al., 1982; New York State, USA	Retrospective cohort; lived alone, with parents or spouse, other	7 m	100%	N=20, 261	No	Mean age = 41; Percent male 46; Schizophrenia 61%; Substance abuse 0%	Yes	3	22% rehospitalization rate; number of previous hospitalizations accounted for 5.8% of the variance in length of time to rehospitalization while living arrangements accounted for .001%
Caton et al, 1984; New York City, USA	Prospective Cohort; SRO	12 m	89%	N=119	No	Mean age = 34; Percent male ~50; Schizophrenia 100%	Yes	3	Moving by 3 months did not increase the likelihood of rehospitalization; however, rehospitalization at 3 months increased the likelihood of a housing change in the following 3 months and future hospitalizations
Drake et al., 1991; New England, USA	Prospective cohort; GH, crisis apt, low cost housing	12 m	Not reported	N=75	No	Mean age=44; Percent male 48; Schizophrenia 100%	Yes	3	Rehospitalization rate was the same for individuals in unstable (stressful) living arrangements as for individuals with stable living arrangements.
Hanrahan et al., 2001; Chicago, USA	Retrospective cohort; CIL	12 m	100%	N=74	No	Mean age=41; Percent male 65; Schizophrenia 80%	Yes	3	Mean days in hospital decreased significantly post housing intervention; hospital use did not differ by level of supervision
Middelboe, 1997 Copenhagen, Denmark * †	Prospective cohort: GH	12 m	94%	N=47	No	Mean age=33; Percent male 64; Schizophrenia 79%	Yes	3	At one year, hospitalization index score (HI) and psychiatric symptom scores were significantly lower and subjective quality of life scores were significantly higher than the same measurements in the year prior to group home entry

TABLE 1 CONT…

Lead Author, Location	Study Type Housing Type	Study Length (months)	Rate of follow-up	Sample Size	Control Group	Sample Characteristics (Study group/controls)	Adjusted for con founding	Strength of Evidence	Main Results
Newman et al., 1994; Baltimore & Hamilton County, USA	Prospective cohort; independent housing	36 m	3 surveys 77, 94 and 92%	N=269	No	Consumers of mental health services; Percent male=43; mean age=36; Psychosis or schizophrenia =53%	Yes	3	One less housing problem was associated with one third fewer service needs per month. At 18 months, a 10% decrease in rent burden was associated with 0.2 days less per month in hospital. Over 36 months, mean hospital days/month declined by 4.5 days but number of admissions did not change.
Segal et al, 1993; California, USA †	Prospective cohort; BCH	10 years 1973-1983	92%	N=393	No	Mean age= 49; Percent male 53; schizophrenia 76%; Sheltered care 100%	Yes	3	41% hospitalized for psychiatric reasons; Hospitalized subjects had more frequent admissions (5.6 vs 2.8) during 1973-1983 than 1963-1973, but mean length of stay per episode was shorter (37 vs 788 days); psychiatric symptoms decreased significantly but independent social functioning worsened (controlling for changes associated with aging)
Culhane et al., 2002; New York City, USA	Quasi experimental; IA, group living	24 m	100%	N=3338	C=3338	Homeless persons matched on age, sex, race, illness, substance abuse, prior service use	Yes	5	Formerly homeless persons with SPMI placed in housing experienced significant reductions in hospitalizations, length of stay per hospitalization, and time incarcerated; outpatient visits increased
Dickey et al., 1996; Boston, USA	Randomized controlled trial; GH, individual apt.	18 m	95%	N=62	C=56	Mean age=37; Percent male 70; Substance abuse 78%; Homeless 100%	Yes	5	Service use did not differ by housing type; comparing persons who never moved (NM) in 18 months to those who did move (M), housing stability and service use were strongly associated: annual mean hospital days was 15 for NM and 56 for M.
Hodgins et al., 1990; Montreal, Canada †	Quasi-experimental; SA	24 m	90, 71% at 18, 24 months	N=61	C=51	Substance abuse 0%; Matched on criteria related to recidivism	Yes	5	Rehospitalization rates, mean hospitalizations, mean hospital days, and time to readmission did not differ between groups; symptom scores similar at 6 months but intervention group had significantly more thought disorder at 24 months.

† also reported mental status outcomes
* also reported quality of life outcomes

TABLE 2: STUDIES OF HOUSING AND MENTAL HEALTH STATUS

Lead author, location	Study Type Housing Type	Study Length (mo nths)	Rate of follow-up	Sample Size	Control Group	Sample Characteristics	Adjusted for con-founding	Strength of Evidence	Main Results
Browne et al, 2004; Australia	Cross-sectional; BH, private homes	N/A	N/A	N=3231	No	Percent male ~ 50; Schizophrenia 100%	No	1	Residents in boarding homes compared to private homes had significantly higher problem severity scores and higher levels of disability.
Davies et al., 1989; Pittsburgh and area, USA	Cross-sectional; BH, BCH, SA, IA	N/A	N/A	N=124	No	Mean age=49.7; Percent male 30 Schizophrenia 100%; Alcoholism 0%	Yes	2	Greater household conflict and more adverse neighbourhood conditions were related to more symptoms of anxiety and depression adjusting for urban/rural location.
Depp et al., 1986; Washington D.C.	Quasi experimental; subsidized housing	6 m	41%	N=51	C=61	Mean age=38; Percent male 35; Schizophrenia 64%	No	2	Symptoms, global severity, and positive symptom distress did not differ significantly between housing subsidy and control groups; number of direct service hours and staff contacts increased for housing subsidy group
Earls et al, 1988; Waterloo Canada	Cross-sectional; IA, parents home, BH, GH	N/A	N/A	N=89	No	Mean age=38; Percent male 60	Yes	2	Housing concerns and the interaction of housing concerns & network size predicted positive and negative affect
Clark et al., 2003; Florida, USA	Quasi-experimental; comprehen-sive housing program	12 m	71%	N=83	C=69	Mean age = 38; Percent male 52 Psychosis ~50% Substance abuse 50%	Yes	3	Reductions in psychiatric symptoms, days of alcohol and drug use occurred over time, but no significant differences found on these measures as a function of program type.
Wong, 2002; California, USA	Prospective cohort	3-12 m	81%	N=98	C= 450	Mean age=37; Percent male 78 Homeless 100%	Yes	3	Obtaining one's own apartment by time 2 did not significantly impact psychological distress for individuals with SPMI or substance abuse disorder
Kearns et al, 1994; New Zealand	Prospective cohort	6 m	86%	N=203	C=100	Percent male 55	Yes	4	A change in residence versus staying put contributed positively to mental health status, adjusting for demographic and social class.
Tsemberis et al, 2004; New York, USA	Randomized controlled study; IA	24m	87% at 12m; 78% at 24 m	N=87	C=119	Mean age = 41; Percent male 79; Psychotic disorder 53%; Homeless 100%	Yes	5	Repeated measures analyses showed no significant differences in psychiatric symptoms, alcohol use, or drug use between Housing First group and Housing Continuum group over time.

TABLE 3: STUDIES OF HOUSING AND QUALITY OF LIFE

Lead author, location	Study Type Housing Type	Study Length (months)	Rate of follow-up	Sample Size	Control Group	Sample Characteristics	Adjusted for con-founding	Strength of Evidence	Main Results
Oliver et al, 1992; England	Cross-sectional; BH, halfway house, GH	N/A	N/A	N=61	No	Mean age=52.1; Percent male 74	No	1	Residents in housing provided by the public, private or voluntary sector (halfway houses, boarding homes or group homes) did not differ in perceived quality of life.
Aubry et al, 1996; Canada	Cross-sectional; BCH, SA	N/A	N/A	N=51	C=51	Groups matched on sex and location; Schizophrenia 57 %	Yes	2	Compared to persons with SPMI in housing programs, community residents (no diagnosis) reported a better quality of life.
Mares et al., 2002; USA	Cross-sectional; BCH	N/A	N/A	N=162	No	Mean age=58; Percent male 94; Schizophrenia ~70%; War veterans	Yes	2	For war veterans with SPMI, social climate was positively associated with general well-being and perceived conflict at home was negatively associated with general well-being.
Nelson et al., 1995; 1997; 1998; 1999 Ontario, Canada; †	Prospective cohort with some cross-sectional data analysis	12 m	62%	N=173	No	Mean age=37.4; Percent male 58	Yes	2	BCH residents had higher total life satisfaction than SA and GH residents; controlling for age and baseline negative affect, number of housing concerns and not having one's own room was positively related to negative affect at T_2
Okin et al, 1993; USA *	Prospective cohort; GH	11 years	100%	N=53	No	Percent male 53 Schizophrenia 72%	No	2	The group showed improvement from baseline in 3 of 6 subscales of a 100-item life satisfaction interview.
Baker et al, 1990; USA	Prospective cohort	9 m	86%	N=844	No	Mean age=56; Percent male 44 Schizophrenia 65%	Yes	3	Moving from appropriate to inappropriate housing was related to a deterioration in perceived quality of life
Srebnik et al., 1995; Five American states	Prospective cohort	12 m	Not reported	N=115	No	Mean age=38; Percent male 53; Schizophrenia 63%; Substance abuse 38%	Yes	3	Amount of perceived choice was positively related to change in happiness and life satisfaction one-year later. In regression analysis, choice variables did not contribute significantly to a change in life satisfaction.
Schutt et al., 1997; Seidman et al, 2003; Boston and area, USA; †	Randomized controlled study	18 m	80%	N=56	C=56	Median age=37; Percent male 67 Substance abuse 67%; Homeless 100%	Yes	5	Total neuropsychological functioning improved significantly for both groups. Executive functioning subscore decreased significantly for IA group. Housing placement was not associated with change in life satisfaction; life satisfaction was unrelated to housing type, housing preference or baseline life satisfaction.

† also reported mental status outcomes