People, places and policies – trying to account for health inequalities in impoverished neighbourhoods

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Abstract

Objective: We consider associations between individual, household and area-level characteristics and self-reported health.

Method: Data is taken from baseline surveys undertaken in 13 socio-economically disadvantaged neighbourhoods in Victoria (n=3,944). The neighbourhoods are sites undergoing Neighbourhood Renewal (NR), a State government initiative redressing place-based disadvantage.

Analysis: This focused on the relationship between area and compositional factors and self-reported health. Area was coded into three categories; LGA, NR residents living in public housing (NRPU) and NR residents who lived in private housing (NRPR). Compositional factors included age, gender, marital status, identifying as a person with a disability, level of education, unemployment and receipt of pensions/benefits.

Results: There was a gradient in socio-economic disadvantage on all measures. People living in NR public housing were more disadvantaged than people living in NR private housing who, in turn, were more disadvantaged than people in the same LGA. NR public housing residents reported the worst health status and LGA residents reported the best.

Conclusions: Associations between compositional characteristics of disability, educational achievement and unemployment income and poorer self-reported health were shown. They suggested that area characteristics, with housing policies, may be contributing to differences in self-reported health at the neighbourhood level.

Implications: The clustering of socio-economic disadvantage and health outcomes requires the integration of health and social support interventions that address the circumstances of people and places.

Key words: Socio-economic factors, family characteristics, health status, public policy, public housing, residential mobility

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Associations between socio-economic position and health are well-established. The socio-economic position/health gradient is evident in international[1,2] and Australian studies.[3-6] Moreover, there are increasing tendencies in Australia (and other countries) for clustering by socio-economic position (SEP) into different neighbourhoods and suburbs.[7-9] This contributes to the associations between socio-economic position and health displaying area-level effects.[10-12] The spatial patterning of health shows strong associations with compositional characteristics of populations, however, area-effects are also inferred from between-area differences that cannot be attributed to individual-level variance. Indicators of socio-economic position measured at the individual- and household-levels, such as income, education, work status and housing tenure, have well-established and consistent associations with a range of health outcomes.[4,6,13,14] The significance of compositional factors has garnered much attention in epidemiological work exploring health inequalities in the wake of the 'second epidemiological revolution' when chronic diseases became prominent as key public health issues in developed nations.[15] Evidence for the spatial patterning of health inequalities has also activated ongoing programs of research seeking to identify and conceptualise the mechanisms and pathways for contextual area-effects. Area-level effects are largely assumed to be linked to contextual characteristics of places.

There is accruing evidence pointing to links between neighbourhood contextual factors and a range of health outcomes and health-related pathways.[16-22] The mechanisms through which contextual factors associated with neighbourhood-level socio-economic disadvantage may be influencing health span are: aspects of physical environments,[23-32] issues of access to health-promoting services and facilities,[33-35] and psychosocial processes. The latter refers to chronic and cumulative stresses that arise in response to dilapidated and dangerous physical environments, compromised feelings of safety and everyday difficulties.[23,24,28,36]

As research efforts have sought to identify, conceptualise and measure the discrete contributions of compositional and contextual influences on health, it has become increasingly clear that factors linked to these influences are implicated in interdependent and co-mingling processes. Some contextual

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factors are derived from aggregated household-level situations (for example a high percentage of low income households residing in particular neighbourhoods generates a context of neighbourhood disadvantage). Socio-economic homogeneity in neighbourhoods intensifies the effects of collective deficits (or resources in contexts of concentrated socio-economic advantage in neighbourhoods). This is suggested in findings that show that individuals in low SEP households living in poor neighbourhoods have worse health outcomes compared to low SEP households in economically heterogeneous or affluent neighbourhoods. Conversely, individuals in high SEP households living in affluent neighbourhoods have better health outcomes than those living in poor neighbourhoods.[16,21] Compositional characteristics can also be strongly conditioned by social processes, including those operating at the neighbourhood-level.[13,37,38] Cross-level analyses show that individual- and area-effects are highly interactive and contextual aspects of places have a mediating or modifying influence at the individual-level.[13,16,18-22] Finally, contextual factors appear to have 'dose' effects, where regular participation in activities outside socio-economically disadvantaged neighbourhoods appears to dilute potentially negative influences on health status for residents.[39]

Increasingly complex theoretical models are being developed to account for the cascading implications of the interrelationships between compositional and contextual factors.[36,40] However, compositional influences on place have received limited attention in much of the work seeking to understand the spatial patterning of health and ill-health.[41] Key compositional factors such as health histories and household SEP are critical for understanding the spatial patterning of ill-health. Housing policies, including public housing allocation criteria and housing markets, influence the distribution of compositional characteristics related to health and SEP status because they determine residential mobility in and out of socio-economically advantaged and disadvantaged neighbourhoods.[41] The combination of housing policy and biographical circumstances heightens tendencies for household disadvantage to concentrate in some neighbourhoods, and produces 'risky' local settings that compound and exacerbate the implications of compositional factors.[41]

In addition to the relevance of place-based factors in contributing to poor health in socio-economically disadvantaged neighbourhoods that have been reported in the research literature, compositional influences on place are also likely to have some currency in explaining the spatial patterning of health and ill-health in Australian settings. In Victoria, around 3% of the total housing stock is publicly owned and these dwellings are largely located in distinctive, uniform tracts of housing in working-class neighbourhoods close to (former) industrial precincts.[42] Similar to other late-capitalist societies, the role of public housing has been transforming since the 1980s, with key shifts including the 'selling off' of publically owned housing stock into private-ownership through 'right to buy' schemes, and there has been a move away from supplying affordable housing to low-income working families to providing housing for priority groups.[43-44] The combination of the geographical concentration of limited public housing stock that is increasingly reserved for individuals and families with high needs for social and other forms of support has contributed to the clustering of the poorest households in neighbourhoods already rendered vulnerable through processes of economic restructuring.

The aim of this paper is to begin exploring how area-effects linked to compositional and contextual factors are relevant for understanding the spatial patterning of health inequalities in Australian settings. The analyses in this paper consider associations between compositional characteristics and self-reported health status among a sample of public and private housing residents living in neighbourhoods of concentrated neighbourhood disadvantage and a comparator group of Local Government Area (LGA) residents. The data were collected as part of the Neighbourhood Renewal (NR) Strategy under way in Victoria. The NR strategy is an area-based intervention to reduce inequalities between NR sites and the Victorian state average across a range of social, educational and health outcomes and has been implemented in 19 of the state's most disadvantaged neighbourhoods. Accordingly, the strategy targets the cumulative and compounding effects of locational disadvantage, including poorer health outcomes.

Method

Site selection

Data has been drawn from baseline surveys undertaken in 13 of the NR sites. The NR sites were selected for intervention because they rated poorly compared to the state's average on a range of indicators including: the official unemployment rate; welfare status (unemployment, disability and health care card holders); average taxable income; persons completing year 12 education; sole-parent families; crime rate per 1,000 residents; emergency hospital admissions; and child protection notifications.[45] Neighbourhood Renewal sites also had relatively high concentrations of older public housing, with the proportions varying from 100% (inner urban high-rise sites) to 10% (a metropolitan fringe site) of housing stock (see Table 1). The sites represented a range of geographical

Table 1: Neighbourhood renewal (NR) sites included in the study.

NR site	Population	% residences public housing
Atherton Gardens	1,415	100
Broadmeadows	4,708	29
Colac	3,941	21
Collingwood	1,520	100
Doveton/Eumemmerring	9,684	13
Eaglehawk/Long Gully	2306	48
LaTrobe Valley	4,736	62
Maidstone/Braybrook	9,844	21
Norlane/Corio	20,134	18
Seymour	2,650	35
Shepparton	1,742	73
Wendouree West	2,485	43
Werribee	6,837	10

Source: http://www.neighbourhoodrenewal.vic.gov.au/projects

divisions, with some sites being segments of suburbs and others comprising one or more entire suburbs; and sites located in inner urban, metropolitan, provincial and rural settings.

Data collection and sampling

Each of the NR projects is required to undertake surveys every two years with residents in the NR area and a comparator group living in the same LGA. The information is collected to inform local intervention activities and to track the progress of individual NR projects. The survey instrument was developed by the Institute of Social Research at Swinburne University. Experienced research partners (usually university-based researchers, but some research partners were based in NGOs and TAFEs) were engaged at each of the sites to work collaboratively with NR personnel and residents to conduct the biannual surveys. Local residents were enlisted as peer-interviewers (around 20 per site) to administer the surveys in face-to-face interviews. The peer-interviewers were provided with 12 hours of training in research issues and supported during the interview process by the institutionally-based research partners.

The overall sampling quota for each site was 300, apart from one much larger site with 600 respondents. Interviews were only conducted with residents aged 18 years and over. Convenience sampling was used to select one participant per household. Two approaches were used to recruit residents to participate in the survey. All residents living in NR areas were informed of the survey and invited to participate. This was achieved through a variety of local dissemination strategies. Some surveys were translated and administered in community languages (recording responses in English), while less common language groups used English-language surveys and translated as they went along.

Participants were also recruited through peer interviewer networks. Peer interviewer methods are effective in securing the participation of potentially 'hard-to-reach' populations and extending available resources.[46] Peer interviewer methods were particularly suitable for the NR community surveys because they facilitated the participation of hard-to-reach populations and enabled a large number of respondents to be interviewed at each NR site. Peer interviewers were either allocated residents to interview, or approached residents at community sites with information about the community surveys and inviting them to participate. Other peer interviewers used what has been described as 'outreach interviewing' where respondents were recruited through personal and community networks.[46] Outreach interviewing was a particularly useful strategy for recruiting residents from culturally and linguistically diverse communities and other hard-to-reach populations in the neighbourhoods. Peer-interviewers were reimbursed for participating in training sessions (12 hours), and both interviewer and respondents were reimbursed $20 for each interview. The participatory method was also useful for fostering community engagement in local NR projects. The use of a structured survey instrument enhances the reliability of data that are collected using peer interviewers.[47]

Comparator data for each of the NR sites were obtained by conducting a truncated version of the survey over the telephone with 150 residents from the wider Local Government Areas (LGAs) in which the intervention sites were located. The comparator group was sampled for socio-economic position according to the SEIFA index for each LGA, and 15 residents from each SEIFA decile were randomly selected by telephone and interviewed. The full quota of 150 surveys was not met in some LGAs.

Instruments and procedures

The baseline surveys of NR site residents and comparator populations that are analysed here were carried out over 2002-04. Where possible, interviews were arranged to be conducted at community-based sites and many were also conducted at participants' homes.

The surveys gathered current and retrospective data across nine domains: perceptions and experience of the neighbourhood; housing and the physical environment; transport, services and government; employment, education and the local economy; health and well-being; personal safety and crime; community pride and participation; the NR strategy; respondent and household demographics. The NR surveys collected closed- and open-ended responses. However, surveys for the LGA sample only included close-ended questions. Items specific to NR activities were also omitted.

Selected demographic information and responses from the health and well-being domain (self-reported health status) collected from surveys undertaken across 13 NR sites (n=3,944) and their surrounding LGAs (n=1,857) were used for the analyses here. This provided a total sample size of 5,801 respondents. Eight sites were in regional areas of Victoria and the remainder located in metropolitan Melbourne. Public housing tenants made up 51% of the NR sample and 5% of the LGA sample.

Analysis

These analyses focused on the relationship between area and compositional factors and health. Area was characterised in terms of intervention status (NR or LGA) within NR sites and further distinction was made between private (NRPR) and public housing tenure (NRPU). This allowed a better analysis of contexts than would have been possible using ecological data collected at an area level. The NR private housing group included people who owned their own home, were paying off their own home or renting privately owned housing. This was done because there are important differences in the conditions of public and private housing within NR areas, including housing stock, policy frames, and in some cases, the housing is spatially differentiated in the neighbourhood.

The analyses considered compositional factors such as age (18-25, 26-40, 41-60, 61-80 and 81 and over), gender, marital status (married/de facto, single/never married and divorced/ separated/ widowed), identifying as a person with a disability, level of education (TAFE/University, VCE or leaving certificate, up to year 10), unemployment and receipt of pensions/benefits.

The health measure was based on the survey question 'In general, would you say your health is excellent, very good, good, fair or poor?' In the analyses, the five response categories were reduced to two (excellent/very good/good and fair/poor).

Table 2: Compositional factors by area.

Compositional factors	LGA (%)	NRPR (%)	NRPU (%)
Age	**n=1,812**	**n=1,886**	**n=1,969**
18-25	9.0	13.0	12.0
26-40	30.6	29.9	37.6
41-60	37.7	33.6	34.2
61-80	19.0	22.1	15.0
81 and over	3.7	1.3	1.1
Gender	**n=1,838**	**n=1,872**	**n=2,002**
Male	35.4	34.8	31.8
Female	64.6	65.2	68.2
Marital status	**n=1,829**	**n=1,912**	**n=2,000**
Married/de facto	59.0	54.5	32.4
Single/never married	21.7	22.6	35.0
Divorced/separated/ widowed	19.3	22.9	32.6
Persons with a disability	**n=1,857**	**n=1,920**	**n=2,024**
No	84.8	76.6	66.9
Yes	15.2	23.4	33.1
Highest level of education	**n=1,812**	**n=1,898**	**n=1,987**
Up to year 10	28.7	52.4	61.8
VCE or leaving certificate	31.5	26.5	26.3
TAFE or University	39.8	21.1	11.9
Unemployed	**n=1,849**	**n=1,919**	**n=2,023**
No	95.1	92.0	86.2
Yes	4.9	8.0	13.8
Pension/Benefits	**n=1,822**	**n=1,899**	**n=1,987**
No	54.0	30.4	10.0
Yes	46.0	69.6	90.0

Multinomial and logistic regression were used to examine whether compositional factors varied by area. Helmert contrasts were used to compare the composition of NR areas to the LGA and to compare the composition of NR public housing residents to NR private housing residents. Logistic regression was used to examine the relationship between area and compositional factors and self-reported health. Helmert contrasts were again used to compare areas. Indicator contrasts were used for all other variables. All analyses controlled for clustering by NR site by including a site variable in the analysis. The analyses were conducted in SPSS 15.0.

Results

Area differences in compositional factors

Tables 2 and 3 show that there were significant differences between areas that can be attributed to compositional differences of sex and age. Overall, people living in the NR areas were less likely than people living in the LGA to be married or in de facto relationships. The NR public housing group were less likely to be married or in de facto relationships than their counterparts in private housing. NR residents were more likely than people in the LGA to identify as a person with a disability, have education only up to year 10, be unemployed and be in receipt of a pension or benefit. NR public housing residents had a greater level of disability and socio-economic disadvantage than NR private housing residents.

Table 3: Odds for differences in compositional factors by area.

Compositional factors	NR vs LGA		NRPU vs NRPR	
	AOR (95%CI)*	*p*	AOR (95%CI)[a]	*p*
Age				
18-25	Ref		Ref	
26-40	0.78 (0.63-0.96)	0.017	0.96 (0.00-1.40)	0.004
41-60	0.63 (0.51-0.77)	0.001	0.77 (0.07-1.24)	0.065
61-80	0.67 (0.54-0.84)	0.001	0.84 (0.06-0.79)	0.064
81 and over	0.23 (0.15-0.35)	0.001	0.35 (0.38-0.75)	0.377
Gender				
Male	Ref		Ref	
Female	1.08 (0.96-1.22)	0.189	1.36 (1.17-1.58)	0.001
Marital status				
Married/de facto	Ref		Ref	
Single/never married	1.83 (1.59-2.11)	0.001	2.11 (0.00-2.41)	0.001
Divorced/separated/ widowed	2.01 (1.74-2.32)	0.001	2.32 (0.00-2.38)	0.001
Person with a disability				
No	Ref		Ref	
Yes	2.16 (1.87-2.50)	0.001	1.74 (1.49-2.03)	0.001
Highest level of Education				
Up to year 10	Ref		Ref	
VCE or leaving certificate	0.41 (0.35-0.47)	0.001	0.47 (0.00-0.77)	0.002
TAFE or University	0.19 (0.16-0.22)	0.001	0.22 (0.00-0.39)	0.001
Unemployed				
No	Ref		Ref	
Yes	2.34 (1.84-2.97)	0.001	1.42 (1.12-1.80)	0.003
Pension/Benefits				
No	Ref		Ref	
Yes	5.46 (4.79-6.22)	0.001	4.65 (3.82-5.66)	0.001

Note: (a) adjusted for clustering by area.

Associations between compositional and area factors on self-reported health

Tables 4 and 5 show that both area and compositional factors were associated with self-reported health. NR residents were more likely than LGA residents to report fair poor/health and in turn NR public housing residents were more likely to report fair poor/health than NR private tenure residents. People classified in age categories greater than 40 years were more likely to report fair/poor health than people aged 18-25 years. People with disabilities were more likely than people who did not identify as having a disability to report fair/poor health. People with educational attainment above year 10 (VCE/leaving and TAFE/University) were less likely than people educated up to year 10 to report fair/poor health. Unemployment and receipt of pensions/ benefits were associated with greater odds of reporting fair/poor health.

Discussion

The association between health status and compositional characteristics, including having a disability, educational achievement, tenure, unemployment and income are well-established.[4,14] There has been less research that has examined how these compositional characteristics, in tandem with factors such as housing policy, may be contributing to the geographical distribution of health inequalities.[41] The results showed that area remained strongly associated with self-reported health even after taking into account compositional differences between areas. NR residents were more likely than LGA residents to report fair/poor health. However, within NR areas public housing residents reported worse health status than residents in private tenure housing. The findings emphasise the importance of capturing contextual variation within, as well as between areas and pointed to the interplay of compositional and contextual factors as contributing to the observed variation.

The interplay of compositional factors, area-effects and housing policy is likely to offer some explanation for the variation between residents in private and public housing tenure within NR sites. The relatively high concentration of public housing stock in the NR neighbourhoods provides accommodation to many individuals and families with multiple problems, including poor health, or who are living in circumstances that dispose them towards poor health. These situations are likely to be key factors in explaining the high

Table 4: Percentage of Fair/Poor health by area and compositional factors.

Area and Compositional factors	n	Fair/Poor (%)
Housing Type		
LGA	1,849	18.9
NRPR	1,915	29.8
NRPU	2,014	46.0
Age		
18-25	659	19.0
26-40	1,876	25.2
41-60	2,006	36.0
61-80	1,063	40.6
81 and over	114	41.2
Gender		
Male	1,961	33.0
Female	3,816	31.3
Marital status		
Married/de facto	2,785	24.9
Single/never married	1,554	29.7
Divorced/separated/ widowed	1,459	42.1
Persons with a disability		
No	917	20.6
Yes	958	67.7
Highest level of Education		
Up to year 10	2,783	41.8
VCE or leaving certificate	1,607	25.0
TAFE or University	1,372	19.6
Unemployment		
No	1,678	31.6
Yes	196	36.6
Pension Benefits		
No	254	14.3
Yes	1,576	39.5

Table 5: Odds of Fair/Poor health by area and respondents' characteristics.

Area and Compositional factors	AOR (95%CI)[a] n=5,403	*p*
Area		
NR vs LGA	1.86 (1.57-2.21)	0.001
NRPU vs NRPR	1.54 (1.29-1.84)	0.001
Age		
18-25	Ref	
26-40	1.15 (0.89-1.49)	0.283
41-60	1.8 (1.38-2.35)	0.001
61-80	1.83 (1.36-2.46)	0.001
81 and over	1.76 (1.05-2.97)	0.033
Gender		
Male	Ref	
Female	1.06 (0.92-1.23)	0.413
Marital status		
Married/de facto	Ref	
Single/never married	0.85 (0.72-1.01)	0.060
Divorced/separated/ widowed	0.92 (0.75-1.13)	0.424
Person with a disability		
No	Ref	
Yes	6.09 (5.23-7.09)	0.001
Highest level of Education		
Up to year 10	Ref	
VCE or leaving certificate	1.11 (0.90-1.36)	0.335
TAFE or University	1.55 (1.28-1.87)	0.001
Unemployed		
No	Ref	
Yes	1.28 (1.02-1.61)	0.034
Pension Benefits		
No	Ref	
Yes	1.79 (1.48-2.16)	0.001

Note: (a) adjusted for clustering by area

levels of poor self-reported health among residents with public housing tenure. In Victoria in 2006/07, 70% of all public housing allocations went to 'Early Housing' applicants and this category includes those who have urgent medical needs or long-term health problems; a disability; are living in unsafe, inappropriate or overcrowded housing or endure recurrent homelessness.[48,49] For longer-term public housing residents, ongoing poor health may be constraining opportunities to move into private rental markets. In the context of housing policies, the observed associations between living in public housing and poorer self-reported health should be anticipated.

Less directly, public housing policy effects all the residents in NR sites where circumstances of concentrated household-level disadvantage may consequently generate local contexts that influence health through indirect processes. Outer metropolitan and regional NR sites offer limited access to private services and facilities and, in turn, this heightens demand for available public services and facilities.[50] Other contextual factors include perceived problems associated with the presence of physical disorders and social incivilities in neighbourhood environments. The research literature reports links between perceptions of disorders and incivilities in local physical and social environments and poorer health status.[22-24,27,28] Related analyses of open-ended data from the surveys suggests that many NR residents were deeply concerned with disorders and incivilities in their local environments, and likely to have increased exposure to troubling aspects of neighbourhood environments, compared to residents of LGA sites.[51] These aspects of neighbourhoods may be sources of stress for some residents through the ways in which they compromise feelings of security and safety.

Another explanatory factor for poorer self-reported health among NR private residents may involve potential residualisation effects. This is because many residents in private housing tenure in NR sites are likely to be former public housing tenants who have become home-owners through 'right-to-buy' schemes that transferred public housing stock into private housing. Ongoing poor health and chronic health conditions may continue to constrain opportunities to move out of the NR areas. Studies from the UK suggest that selective migration strongly influences area-level health statistics of disadvantaged neighbourhoods.[52] Interim evaluation of New Deal for Communities programs (NDC) in the UK, also indicated clear residualisation patterns in health and socio-economic indicators because people who moved out of NDC areas had better health, educational and employment status then either those who were moving into the neighbourhood or long-term residents, with the latter reporting the highest rates of long-term limiting illness.[53]

These findings lend support to the argument that in addition to contextual aspects of neighbourhoods, compositional factors, such as health histories and employment trajectories in tandem with housing policies, are important influences on the spatial patterning of health and ill-health.[41] The mechanisms through which housing policies serve to cluster low-SEP households in some neighbourhoods involve related processes. Firstly, 'health selective' processes are driven by the interlinked circumstances of the location of public housing stock, public housing allocation criteria, and restrained access to private housing markets among low SEP households. These factors combine to constrain housing options for people experiencing long-term and limiting illness. Related processes of 'entrapment', whereby circumstances converge to limit opportunities for residential mobility out of deprived and health-impairing neighbourhoods; and 'displacement', where residents living in higher socio-economic status neighbourhoods who experience the onset of long-term and limiting illness, can be compelled to relocate to low-SEP neighbourhoods, further reinforce the spatial distribution of health and ill-health in neighbourhoods. In turn, these compositional drivers intensify deprivation in some neighbourhoods and aggravate potentially health-impairing contextual aspects.[41]

The health-impairing contextual aspects of concentrated household disadvantage in neighbourhoods may account for some of the variance in self-reported health between LGA and NR private tenure residents. After adjusting for the available compositional factors, the unexplained variation between the LGA and NR private tenure residents may be attributable to area-effects associated with contextual aspects of NR sites. This explanation finds some support in other analyses of these data, where NR residents report higher levels of dissatisfaction with their neighbourhood as a place to live and feel less safe and secure in their neighbourhood, compared to LGA residents.[51,54] The aetiological pathways for these area-effects remain poorly understood and should receive focused attention in future research.

There are limitations to the study. The NR sites and comparator LGAs were pre-selected precluding a cluster randomised trial. This may limit the generalisability of the results to other areas. The different approaches to surveying NR residents (face-to-face) and LGA residents (telephone) may have influenced the data that was collected. However, the use of peer interviewers for the NR residents is likely to have enhanced response rates among hard-to-reach populations, including low-SEP households and non-English speaking residents. The cross-sectional data that is used for the analyses ensure it is difficult to determine if similar forms of residualisation, that are evident in UK data, have been occurring among NR residents in private tenure. Improved understanding of local patterns of residential mobility, particularly residents moving into and out of NR sites, would greatly assist in understanding issues related to processes of health selection, entrapment and displacement that may be influencing the spatial distribution of health and illness at neighbourhood levels. There are also risks of attributing area-effects to latent compositional characteristics that are not identified in the survey, but are relevant to health. Some of these factors may relate to earlier life course exposures, including occupational health risks or growing up in a disadvantaged neighbourhood.[55-56] Compositional characteristics that are not considered in the analyses in this paper, such as ethnicity and transnational migration, may also influence individual- and area-level variations. Ethnicity indicates a range of circumstances that are likely to effect health-related issues, and while some of

the neighbourhoods in this study were ethnically diverse, overall these influences are unlikely to be detected in the aggregated sample. This is because the populations of most of the NR sites were predominantly Anglo-Australian or from English-speaking backgrounds.

The study also relied on a single measure of self-reported health. While self-reported health is viewed as a reasonably reliable and predictive measure, its subjective response categories are open to variable interpretation.[57] Further, as a global assessment of health, specific pathways for disease remain opaque. Additional health indicators, including objective indicators such as rates of mortality, morbidity, hospital admissions, would offer clearer understanding of health risks that are presented in local settings. Carefully designed qualitative and quantitative studies are needed to develop explanatory accounts of associations that are evident in the analyses reported here.

Conclusions and implications

These findings provide critical insights that begin to unravel and consider the significance of interrelated influences on health in some of the most disadvantaged neighbourhoods in Victoria. The findings point to an array of issues that are likely to be implicated in the geographical dimensions of health disparities. NR efforts are necessarily directed at relieving the effects of longstanding disadvantage and this is being achieved through integrated responses targeting local environmental, social, economic and health issues. More broadly, the findings support concerns that Australian housing assistance policies and practices are contributing to the patterning of social, economic and health inequalities between neighbourhoods.[44] Adjustments to housing policies may be crucial for enabling public health policies to be more effective in redressing the spatial patterning of health and ill-health. Other research shows that neighbourhood contextual effects appear to be non-linear and triggered at threshold points of concentrated household disadvantage, combined with a paucity of high SEP households.[37,58,59] Promoting socio-economic heterogeneity in poor neighbourhoods may generate health benefits for residents.

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