PERGAMON

Social Science & Medicine 57 (2003) 477–486

SOCIAL SCIENCE & MEDICINE

www.elsevier.com/locate/socscimed

Socio-demographic predictors of self-rated health in the Republic of Ireland: findings from the National Survey on Lifestyle, Attitudes and Nutrition, SLAN

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Abstract

Though Ireland continues to have a poor health profile compared with other European Union countries, previous research on social variations has been limited. For the first time in the Republic of Ireland, the influence on self-rated health of various socio-demographic indicators was assessed in a multi-variate logistic regression model, separately for men and women. Data were from the first National Survey of Lifestyles, Attitudes and Nutrition, SLAN, conducted by post in a multi-stage, cluster random sample across 26 counties. There were 6539 respondents (45.4% males). Mean self-rated health differed significantly according to age, marital status, tenure, educational status, social class, household size and eligibility for general medical services (GMS), but not according to gender or rurality. There were also differences if residing in a district with low level of affluence, or according to social cluster groupings. There were numerous significant correlations between the nine socio-demographic measures, but the most consistent pattern was between GMS eligibility and the various indicators, for both men and women. In the case of men, whether social class was included in the multi-variate model or not, education status remained predictive in the final model, (OR 2.36 CI 1.35–4.12) as did smoking status (OR 2.11 CI 1.47–3.02). Odds ratio for GMS eligibility was 3.33 (CI 2.61–4.26) attenuated to 1.70 (CI 1.12–2.56) in the final model. For women the pattern was somewhat different. Only GMS status (OR 2.64 CI 1.74–3.99) and level of education (2.25 CI 1.19–4.24) were predictive in the final model. A multi-level analysis showed that area level of affluence was not significantly predictive of self-rated health when individual level factors were taken into account.

Keywords: Self-rated health; Education status; Social class; Employment; Tenure; Ireland

Introduction

Patterns of morbidity and mortality vary markedly across the European region. Explanations have focused increasingly on social and contextual as well as individual-level risk factors. Consequently, there has been much recent interest in the fluctuations in cardiovascular disease mortality across the Eastern European region (Bobak, Pikhart, Rose, Hertzman, & Marmot, 2000; Kelleher, 2001). What remains surprising perhaps, is the continuing wide and unexplained variation within the European Union region itself, especially since most counties have been members of this powerful economic unit for over a generation.

The Republic of Ireland is an interesting example in which to examine the issues current in the social variation literature (Kelleher, 1999). It has twice the death rate from cardiovascular disease of the EU average and it is not fully clear why this should be so, in part because of the absence of longitudinal epidemiological data (Department of Health and Children,

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0277-9536/03/$ - see front matter
PII: S0277-9536(02)00371-4

1999). It is also in considerable social transition, with an economy that boomed during the 1990s. It has lacked historically the post industrial revolution infrastructure seen in its larger near European neighbors, particularly the country to which it was attached for eight centuries, the United Kingdom. What risk profile data are available indicate that poor health status is partly, but by no means completely, explained by traditional biomedical or lifestyle risk factors (Shelley, O'Reilly, Mulcahy, & Graham, 1991, 1995). There is now clear evidence of social variation in mortality patterns at individual level and various health promotion intervention studies in settings like school, workplace and primary care illustrate that both gender and socio-economic status are important factors in determining both behaviours and health outcomes (O'Shea & Kelleher, 2001). A report on health status in both Northern and Southern Ireland indicated clear differences in disease specific mortality according to occupational group and gender but area or regional level differences were most marked in relation to urban and rural comparisons (Balanda & Wilde, 2001). Ireland should constitute a paradigm for some aspects of social capital or social support, if behaviourist measures like church-going, extended supportive family networks and political consensus are considered (Puttnam, 2000).

Yet the relationship to health profile does not conform to expectation, in that indicators of disadvantage, such as education status or social class, while important at individual level, show little evidence of area variation outside the large cities and no strong relationship exists between factors like voting pattern and health (Kelleher, Timoney, Friel, & McKeown, 2002). Furthermore, attempts to examine the lifecourse hypothesis at ecological level yielded only paradox and uncertainty, in that regional infant mortality rates do not correlate strongly with contemporary patterns of cardiovascular morbidity, unlike the patterns seen in the United Kingdom and some of the Scandinavian countries (Pringle, 1998). The best explanation for this is the largely rural patterns of deprivation in the past. The European Union has specially designated the rural border and midland areas of the Republic of Ireland, the so-called BMW region, as deprived, but some health indicators are actually better than other regions. Mortality rates from heart disease are in fact lower in the West coast than in the East for instance (Department of Health and Children, 2000). Ireland also has a huge migrant related diaspora, the health status of which, has, paradoxically, been better studied in some instances than those who remained at home. (Burvil, McCall, Woodings, & Stenhouse, 1983; Wild & McKeigue, 1997; Harrison, Carrhill, & Sutton, 1993; Kushi, Lew, Stare, & Ellison, 1985; Abbotts, Williams, Ford, Hunt, & West, 1999; Harding & Balarajan, 1996, 2001).

Self-rated health is a useful proxy measure for morbidity and mortality patterns in epidemiological studies (Subramanian, Kawachi, & Kennedy, 2001; Kawachi, Kennedy, & Glass, 1999; Mackenbach, Vandenbos, Joung, Vandemheen, & Stronks, 1994; Idler & Beyamini, 1997; Heistaro, Vartiainen, & Puska, 1996; Power, Matthews, & Manor, 1998; Blakeley, Kennedy, & Kawachi, 2001). The inter-relationship between self-rated health and indicators of deprivation may differ according to gender and socio-economic status, both within and between countries (Bartley, Sacker, Firth, & Fitzpatrick, 1999; Matthews, Manor, & Power, 1999; Hraba, Lorenz, Lee, & Pechacova, 1996). Carlson (1998) utilized data from the world values survey in 1990 to examine patterns of self-rated health among respondents aged 35–64 across 25 European countries. He identified the now familiar East–West divide but remarkably the Irish had the best self-rated health in the entire sample. Our objective in this study was to examine self-rated health as a general proxy measure of health status, in order to see whether and how it varied according to socio-economic status, employing the data from SLAN, the first ever national representative survey of lifestyles, attitudes and nutrition in the Republic of Ireland.

Subjects and methods

The survey on lifestyles, attitudes and nutrition, SLAN, was commissioned by Ireland's national Department of Health and Children. Fieldwork was conducted in 1998 and the methodology employed was described in the report of main lifestyle findings (Friel, NicGabhainn, & Kelleher, 1999). This consisted of a multi-staged random sample in selected representative district electoral divisions (DEDs) across the 26 counties of the Republic. For this analysis the following collected variables were included; current age, level of education, (primary, secondary or tertiary), social class as determined by the highest occupational group of either self or household head in the case of women, and classified in the Irish six category ordinal ranking scale, marital status (married, cohabiting, single, never married, widowed, separated, other), residence in a DED classified as rural or urban, tenure, either owner occupied or other accommodation. In Ireland there is a two-tier health service. Comprehensive care, including primary health practitioner services, is provided to all below an arbitrary level of income. This general medical services (GMS) eligibility is assessed on a case by case basis at regional health board level and factors like age, income and post retirement means are taken into account. Approximately a third of the population are entitled to the benefits of the scheme. One lifestyle variable, current cigarette smoking status, was also included, since this is known both to vary according to

socio-economic status and also to influence estimates of self-rated health. As measures of morbidity are known to influence self-rated health as well, these were adjusted for in the subsequent analyses, that is having been told by a doctor that one had angina, a heart attack, stroke, diabetes mellitus, depression or other condition and whether one had hypertension or a raised cholesterol. The prevalence of these conditions has been reported previously (Kelleher, Harrington, & Friel, in press).

In addition to the social status information collected through the questions in the SLAN questionnaire, ecological information was further obtained from the organisation supplying the electoral register sample. Extra socio-economic and affluence information was available at the DED level, derived using overlaying of census 1996 details. DEDs were classified into homogenous social clusters based on age, household composition, number and age of children, social class and occupation, educational attainment, car ownership, tenure and housing amenities. There are 19 unique categories, which collapse into seven clusters (Table 1), each describing a neighbourhood distinctive in socio-economic and lifestyle characteristics. Affluence was determined using six groupings based on Census questions; Family Cycle, At Work by Industry, Socio-economic Group, Car Ownership, Education and Housing. Each category of the six groups was assigned low, medium or high affluence and a final aggregate affluence level determined for each DED. Individuals were then assigned to one of the cluster or affluence groups based on their address.

Data were categorized according to gender and across three age bands, 18–34, 35–54 and 55 years upwards as these arbitrary categories had been used in the original report. Measures of multi-collinearity between social status indicators were assessed by means of Phi coefficients. Differences in the mean self-rated health were assessed using Student's *t*-test and ANOVAs. Finally, for men and women separately, a logistic regression model was created, with dependent variable self-rated health (1 being excellent, very good or good health and 0 being fair or poor health). Independent variables included stepwise in the final model were those significant at univariate level, with age and the self-reported medical conditions listed above included as co-variates. Significance was assessed by means of Wald's chi square test and Nagelkerke's *r* squared technique was employed as a measure of goodness of fit of the main model.

Logistic multi-level regression procedures were used to model the two level structure of individuals within district electoral divisions with the affluence score as the ecological or area level variable. MLWin software with Marginal Quasilikelihood second-order estimation procedures was used to fit the model. A stepwise approach was used with the first model laying out the variation in self-rated health at individual and DED level. The second model allows between DED variation conditional on compositional factors.

Table 1
Composition of social clusters

Professionals	Wealth and education, empty nesters, established professionals, shapers and movers
Home owning mortgages	Drive timing young families, wealthy commuters, suburbanites going grey, provincial wealthy
Provincial	Farming dependent families, urban settled, rural settled
Semi-rural	Worker farmers, affluent landowners
Renters	Young professionals in rejuvenated areas, city dwellers
Agricultural	West coast existence, declining rural areas, substantial agriculture, traditional farming families
Council	Large young families living in deprived estates, council stayers

Results

There was a 62% response rate nationally to SLAN, comprising 6539 respondents, 45.4% of whom were male. The demographic profile was compared to census data and was not appreciably different, though men were relatively under represented (Friel et al., 1999). Distribution of social status indicators in each stratum is given in Table 2. Mean self-rated health differed significantly according to age, marital status, tenure, number in household, education level, employment status, social class and GMS eligibility, level of affluence, type of social cluster but not, notably, by gender and rural location. There was good completion of most questions, though that of social class was relatively low, due in part to the number of older people and women not giving any occupational details. For this reason the multi-variate models were constructed with and without social class.

Inter-relationships between variables were examined for multi-collinearity in six sub categories, separately for men and women and in the three age bands. Considering the inter-relationships between the nine individual level social status variables only, many were statistically significant, but the magnitude of the correlations was not necessarily strong and therefore multi-collinearity was not an issue for subsequent models. Educational status was related consistently to social class in all groups (Phi values at least 0.34 in each). There were also strong relationships between marital status and number in the household, particularly for those over 35 years

Table 2
Mean of self-rated health (SRH) with standard deviation (sd) in brackets, according to social and demographic characteristics of SLAN survey respondents

Variable	Overall $n = 6539$	n (%)	SRH overall mean (sd)	SRH males mean (sd)	SRH females mean (sd)
Gender	Males	2995 (46.7)	2.56 (0.96)		
	Females	3424 (53.3)	2.53 (0.93)		
Age group (years)	18–34	2373 (37.3)	2.30 (0.84)	2.32 (0.87)	2.28 (0.82)
	35–54	2354 (37.0)	2.45 (0.89)	2.47 (0.88)	2.42 (0.89)
	55+	1631 (26.7)	3.04 (0.96)**	3.03 (1.00)**	3.05 (0.93)**
Marital status	Married/ cohabiting	3439 (54.2)	2.50 (0.91)	2.53 (0.93)	2.47 (0.90)
	Single/never	2189 (34.5)	2.46 (0.93)	2.52 (0.96)	2.40 (0.89)
	Previously married	712 (11.2)	3.01 (0.98)**	3.00 (1.01)**	3.01 (0.97)**
Rurality	Urban	2384 (48.0)	2.55 (0.93)	2.56 (0.94)	2.54 (0.91)
	Rural	3076 (52.0)	2.53 (0.95)	2.56 (0.96)	2.50 (0.94)
Tenure	Owned out/ mortgage	5080 (80.4)	2.52 (0.94)	2.55 (0.95)	2.50 (0.93)
	Rented/other	1235 (19.6)	2.62 (0.95)**	2.61 (0.99)	2.62 (0.92)**
Number in household	Alone	851 (13.5)	2.92 (0.96)	2.92 (0.96)	2.89 (0.96)
	With others	5470 (86.5)	2.47 (0.92)**	2.49 (0.93)**	2.46 (0.90)**
Education level	None/primary	1255 (34.1)	3.09 (0.98)	3.03 (1.01)	3.16 (0.94)
	Secondary	2943 (49.2)	2.50 (0.89)	2.49 (0.90)	2.50 (0.87)
	Tertiary	1781 (29.8)	2.28 (0.86)**	2.33 (0.88)**	2.23 (0.84)**
Employment status	Working	3160 (51.9)	2.33 (0.84)	2.37 (0.86)	2.27 (0.80)
	Other	2926 (48.1)	2.77 (0.99)**	2.89 (1.02)**	2.70 (0.96)**
Irish social class scale	SC 1/2	1796 (40.0)	2.28 (0.86)	2.34 (0.87)	2.24 (0.85)
	SC 3/4	1761 (39.2)	2.46 (0.87)	2.49 (0.91)	2.45 (0.84)
	SC 5/6	938 (20.9)	2.57 (0.91)**	2.59 (0.94)**	2.54 (0.86)**
General medical services eligibility	GMS	1827 (29.6)	2.97 (0.98)*	3.00 (1.01)	2.95 (0.96)
	Non-GMS	4337 (70.4)	2.35 (0.86)	2.39 (0.88)**	2.32 (0.84)**
Affluence scale	Low	1543 (25.3)	2.60 (0.98)	2.61 (0.97)	2.59 (0.98)
	Medium	3122 (51.1)	2.55 (0.93)	2.57 (0.94)	2.52 (0.91)
	High	1441 (23.6)	2.46 (0.93)**	2.46 (0.95)**	2.45 (0.90)*
Social clusters	Professionals	406 (6.6)	2.39 (0.9)	2.44 (0.91)	2.32 (0.88)
	Home Owning Mortgage	897 (14.7)	2.49 (0.89)	2.48 (0.91)	2.50 (0.87)
	Provincial	701 (11.5)	2.65 (0.95)	2.66 (0.97)	2.64 (0.93)
	Semi rural	1145 (18.8)	2.48 (0.94)	2.49 (0.95)	2.47 (0.92)
	Renters	390 (6.4)	2.45 (0.91)	2.46 (0.90)	2.42 (0.92)
	Agricultural	1580 (25.9)	2.54 (0.97)	2.59 (0.98)	2.49 (0.96)
	Council	987 (16.2)	2.68 (0.95)**	2.67 (0.96)**	2.69 (0.93)**
Smoking	Yes	1985 (31.2)	2.68 (0.9)	2.72 (0.92)	2.63 (0.88)
	No	4373 (68.8)	2.47 (0.95)**	2.48 (0.95)**	2.47 (0.94)**
Alcohol	Exceed recommended unit	847 (24.7)	2.52 (0.89)	2.60 (0.91)	2.40 (0.85)
	Do not exceed	2584 (75.3)	2.41 (0.89)**	2.47 (0.92)**	2.34 (0.85)

SRH scale ranges from 1 = Excellent, 5 = very poor.
** $p < 0.01$.

old. Table 3 presents the consistent inter-relationships between the two ecological-level factors, social cluster and affluence level, and the measures at individual level. As might be expected, rurality was strongly related to social clusters in all six groups and affluence also inter-related to social clusters.

GMS eligibility was the variable with the strongest and most consistent pattern across groups, being related

Table 3
Phi coefficients and significant levels for collinearity between individual level measures of socio-economic status and ecological level measures of district electoral division in which they reside

	18–34 yr		35–54 yr		55 + yr	
	Social Cluster	Affluence	Social Cluster	Affluence	Social Cluster	Affluence
Males						
Marital status	0.152*	0.119**	0.205**	0.131**	0.178*	0.044
Rurality	0.898**	0.136**	0.881**	0.096**	0.887**	0.151**
Tenure	0.212**	0.104**	0.171**	0.146**	0.176**	0.059
Number in household	0.302**	0.071	0.227**	0.093	0.223*	0.040
Education level	0.190**	0.188**	0.293**	0.206**	0.275**	0.138*
Employment status	0.096	0.103**	0.165**	0.163**	0.171**	0.103*
Social class	0.236**	0.232**	0.252**	0.197**	0.199	0.129
GMS	0.122*	0.083*	0.194**	0.191**	0.167**	0.136**
Social cluster	1.00	0.606**	1.00	0.561**	1.00	0.536**
Affluence		1.00		1.00		1.00
Females						
Marital status	0.140*	0.076	0.253**	0.108*	0.176*	0.083
Rurality	0.888**	0.083*	0.906**	0.145**	0.904**	0.147**
Tenure	0.143**	0.072*	0.155**	0.137**	0.174**	0.068
Number in household	0.212**	0.068	0.253**	0.161**	0.240**	0.068
Education level	0.192**	0.135**	0.203**	0.212**	0.252**	0.203**
Employment status	0.119*	0.071	0.126**	0.102**	0.083	0.050
social class	0.241**	0.180**	0.206**	0.161**	0.274*	0.225**
GMS	0.181**	0.121**	0.182**	0.154**	0.227**	0.164**
Social cluster	1.00	0.631**	1.00	0.580**	1.00	0.574**
Affluence		1.00		1.00		1.00

*$p<0.05$.
**$p<0.01$.

to employment status, social class, household tenure and education. This was therefore entered first into the logistic model, with age and all measures of self-rated morbidity as co-variates and then in order, education, employment status, tenure, marital status and the lifestyle variable, smoking status. In the case of men, in the model excluding social class (Table 4a), non-GMS eligibility, higher level of education, employment status and non-smoking status all remained as significant predictors of excellent/very good or good self-rated health. When social class was included in the model (Table 4b), the same four variables continued to be predictive. In the model for women excluding social class (Table 5a), GMS eligibility or not, level of education, employment status and smoking status were all significant predictors. The inclusion of social class for women (Table 5b) saw GMS eligibility and educational status continuing to be significantly predictive.

As seen in Table 6, multi-level modelling indicated that area variation did exist (model 1) but this was accounted for by individual level variation (model 2) and addition of the area affluence score added nothing and was not statistically significant (model 3, not shown).

Discussion

We confirm with these data that, in the Republic of Ireland, as in other countries, self-rated health shows social variation. This was a self-completed postal questionnaire with a respectable response rate of 62%. It is possible that non-participants in the survey would have had different patterns of health and well-being though the respondents' profile is reasonably close to the census patterns suggesting a representative sample. The rates of positive self-rated health are higher than the European average, notwithstanding the expected inter-relationship with socio-economic factors (Carlson, 1998; Bobak et al., 2000; Department of Health and Children, 2000). This is surprising, given the fact that objective measures of morbidity and mortality, including life expectancy, rates of cardiovascular diseases and some cancers, particularly of breast and colon, are worse than the European Union average. Although Ireland has a younger than average population, adjustment was made for this, both in our own study and others. It is possible that it relates perceptually to the recent improved economic and political situation in the country but we have no direct supportive evidence for this (Kelleher,

Table 4
(a) Males only ($n = 2995$). Dependent variable: self-rated health (1 = excellent/very good/good 0 = fair/poor)

Independent variable		OR [95% CI]						
(a) *Excluding social class*								
Age		0.97 [0.96–0.98]	0.98 [0.97–0.99]	0.99 [0.98–1.00]	0.99 [0.98–1.00]	0.99 [0.98–1.00]	0.98 [0.97–0.99]	
GMS (df 1)	Non-GMS	3.33 [2.61–4.26]	2.82 [2.18–3.65]	2.30 [1.72–3.08]	2.27 [1.69–3.05]	2.26 [1.68–3.05]	2.12 [1.56–2.88]	
Ref: Medical Card (GMS)								
Education (df 2)	Tertiary		2.66 [1.80–3.93]	2.63 [1.76–3.92]	2.62 [1.75-3.93]	2.60 [1.74-3.90]	2.36 [1.56-3.57]	
Ref: None/primary	Secondary		2.10 [1.54–2.86]	1.97 [1.43–2.72]	1.98 [1.44–2.73]	1.97 [1.42–2.73]	1.97 [1.41–2.75]	
Employment status (df 1)	Working			1.81 [1.33–2.46]	1.80 [1.32–2.46]	1.75 [1.28–2.39]	1.68 [1.22–2.32]	
Ref: other								
Tenure (df 1)	Owned				1.10 [0.79–1.52]	1.05 [0.76–1.46]	1.01 [0.72–1.41]	
Ref: rented/other								
Marital status (df 2)	Married/cohabiting					1.30 [0.85–1.98]	1.33 [0.87–2.04]	
Ref: previously married	Single					1.07 [0.68–1.68]	1.03 [0.65–1.63]	
Smoking (df 2)	Non-smoking						2.07 [1.56–2.75]	
Smoking								
Constant, *B*		8.72	10.51	11.02	11.07	10.83	10.9	
Model chi-square		453.5**	459.5**	457.5**	447.9**	447.0**	462.0**	
% Correct predictions		86.51	86.43	86.42	86.65	86.35	86.60	
Nagelkerke R^2		0.268	0.285	0.296	0.293	0.296	0.311	
Model *n*		2743	2572	2453	2427	2395	2365	
(b) *Including social class*								
Age		0.97 [0.96–0.98]	0.98 [0.97–0.99]	0.99 [0.98–1.00]	0.98 [0.97–1.00]	0.98 [0.97–1.00]	0.98 [0.97–1.00]	0.98 [0.96–0.99]
GMS (df 1)	Non-GMS	3.33 [2.61–4.26]	2.82 [2.18–3.65]	2.30 [1.72–3.08]	1.85 [1.24–2.75]	1.81 [1.21–2.69]	1.82 [1.22–2.72]	1.70 [1.12–2.56]
Ref: medical card								
Education (df 2)	Tertiary		2.66 [1.80–3.93]	2.63 [1.76–3.92]	2.57 [1.50–4.43]	2.58 [1.50–4.43]	2.52 [1.46–4.34]	2.36 [1.35–4.12]
Ref: none/primary	Secondary		2.10 [1.54–2.86]	1.97 [1.43–2.72]	2.48 [1.59–3.88]	2.47 [1.58–3.85]	2.40 [1.52–3.77]	2.43 [1.53–3.86]
Employment status (df 1)	Working			1.81 [1.33–2.46]	1.74 [1.17–2.58]	1.74 [1.17–2.58]	1.66 [1.11–2.48]	1.59 [1.05–2.39]
Ref: other								
Class group (df 2)	SC 1-2				1.33 [0.82–2.15]	1.31 [0.81–2.12]	1.31 [0.80–2.14]	1.26 [0.77–2.07]
Ref: SC 5-6	SC 3-4				0.79 [0.53–1.18]	0.79 [0.53–1.18]	0.78 [0.52–1.16]	0.77 [0.51–1.17]
Tenure (df 1)	Owned					1.22 [0.80–1.88]	1.19 [0.77–1.83]	1.14 [0.73–1.78]
Ref: rented/other								
Marital status (df 2)	Married/cohabiting						1.20 [0.70–2.16]	1.18 [0.65–2.13]
Ref: previously married	Single						0.89 [0.48–1.67]	0.82 [0.43–1.56]
Smoking (df 2)	Non-smoking							2.11 [1.47–3.02]
Smoking								
Constant, *B*		8.72	10.51	11.02	10.05	10.06	9.26	9.73
Model chi-square		453.5**	459.5**	457.5**	242.2**	242.3**	242.4**	260.2**
% correct predictions		86.51	86.43	86.42	89.28	89.22	89.01	89.37
Nagelkerke R^2		0.268	0.285	0.296	0.251	0.252	0.255	0.276
Model *n*		2743	2572	2453	1763	1754	1729	1712

** $p<0.01$. Adjusted for presence of angina, heart attack, high blood pressure, stroke, diabetes, high cholesterol, anxiety, depression.

Table 5
Females only ($n = 3424$). Dependent variable: self-rated health (1 = excellent/very good/good, 0 = fair/poor)

Independent variable		OR [95% CI]						
(a) *Excluding social class*								
Age		0.97 [0.96–0.97]	0.97 [0.97–0.98]	0.98 [0.97–0.99]	0.98 [0.97–0.98]	0.98 [0.97–0.99]	0.98 [0.96–0.98]	
GMS (df 1)	Non-GMS	2.93 [2.29–3.75]	2.43 [1.87–3.17]	2.35 [1.78–3.10]	2.30 [1.72–3.08]	2.27 [1.69–3.06]	2.44 [1.80–3.30]	
Ref: medical card (GMS)								
Education (df 2)	Tertiary		2.30 [1.52–3.48]	2.15 [1.40–3.30]	2.14 [1.39–3.31]	2.33 [1.49–3.66]	2.28 [1.44–3.61]	
Ref: none/primary	Secondary		1.96 [1.45–2.64]	1.88 [1.38–2.56]	1.83 [1.34–2.50]	1.82 [1.33–2.49]	1.82 [1.32–2.51]	
Employment status (df 1)	Working			1.43 [1.02–2.00]	1.40 [0.99–1.97]	1.46 [1.03–2.06]	1.42 [1.00–2.01]	
Ref: Other								
Tenure (df 1)	Owned				1.19 [0.86–1.65]	1.16 [0.83–1.62]	1.07 [0.77–1.51]	
Ref: rented/other								
Marital status (df 2)	Married/cohabiting					1.04 [0.74–1.46]	0.99 [0.70–1.40]	
Ref: previously married	Single					0.86 [0.57–1.30]	0.80 [0.53–1.22]	
Smoking (df 2)	Non-smoking						1.33 [0.99–1.79]	
Smoking								
Constant, *B*		5.97	7.60	7.20	7.11	6.94	7.48	
Model chi-square		549.0**	538.8**	498.5**	493.0**	488.7**	483.0**	
% correct predictions		88.48	87.74	87.92	87.91	87.94	88.34	
Nagelkerke R^2		0.294	0.305	0.300	0.300	0.301	0.305	
Model *n*		3169	2937	2797	2762	2728	2685	
(b) *Including social class*								
Age		0.97 [0.96–0.97]	0.97 [0.97–0.98]	0.98 [0.97–0.99]	0.97 [0.95–0.98]	0.96 [0.95–0.98]	0.96 [0.95–0.98]	0.96 [0.94–0.97]
GMS (df 1)	Non-GMS	2.93 [2.29–3.75]	2.43 [1.87–3.17]	2.35 [1.78–3.10]	2.65 [1.80–3.89]	2.55 [1.71–3.81]	2.66 [1.76–4.01]	2.64 [1.74–3.99]
Ref: medical card								
Education (df 2)	Tertiary		2.30 [1.52–3.48]	2.15 [1.40–3.30]	1.96 [1.07–3.59]	1.98 [1.08–3.65]	2.28 [1.21–4.28]	2.25 [1.19–4.24]
Ref: none/primary	Secondary		1.96 [1.45–2.64]	1.88 [1.38–2.56]	2.09 [1.30–3.37]	2.06 [1.28–3.33]	2.06 [1.27–3.32]	2.07 [1.28–3.35]
Employment status (df 1)	Working			1.43 [1.02–2.00]	1.17 [0.79–1.73]	1.15 [0.77–1.71]	1.18 [0.78–1.77]	1.20 [0.79–1.80]
Ref: other								
Class group (df 2)	SC 1-2				0.87 [0.52–1.48]	0.89 [0.52–1.50]	0.87 [0.51–1.49]	0.85 [0.50–1.45]
Ref: SC 5–6	SC 3-4				0.85 [0.54–1.34]	0.84 [0.53–1.33]	0.88 [0.55–1.41]	0.85 [0.53–1.36]
Tenure (df 1)	Owned					1.15 [0.73–1.82]	1.10 [0.69–1.76]	1.06 [0.66–1.70]
Ref: rented/other								
Marital status (df 2)	Married/Cohabiting						0.78 [0.44–1.39]	0.79 [0.45–1.41]
Ref: previously married	Single						0.54 [0.28–1.05]	0.53 [0.27–1.04]
Smoking (df 2)	Non-Smoking							1.26 [0.85–1.86]
Smoking								
Constant, *B*		5.97	7.60	7.20	2.95	2.98	2.59	2.50
Model chi-Square		549.0**	538.8**	498.5**	234.6**	236.5**	235.0**	239.7**
% Correct predictions		88.48	87.74	87.92	91.91	91.90	92.04	91.92
Nagelkerke R^2		0.294	0.305	0.300	0.243	0.246	0.249	0.255
Model *n*		3169	2937	2797	2040	2025	1997	1979

** $p<0.01$. Adjusted for presence of angina, heart attack, high blood pressure, stroke, diabetes, high cholesterol, anxiety, depression.

Table 6
Multi-level logit estimates for model 1 and 2[a]

Parameters	Model 1 (null model)	Model 2 (after accounting for compositional factors)
Fixed part		
Individual factors		
Constant	1.792 (43.00)	0.594 (2.93)
Age (centred on mean)		−0.034 (8.50)
Female		0.278 (2.26)
No medical card		0.803 (5.69)
Employed		0.398 (2.82)
Home owner		0.224 (1.43)
Social class 1/3		0.084 (0.46)
Social class 3/4		−0.199 (1.38)
Tertiary education		0.746 (14.90)
Secondary education		0.679 (4.19)
Random part		
Level-2 (between DED)	0.0775 (2.056)	0.000374 (0.007)

[a] Estimate divided by its standard error given in bracket. A value $> \pm 2$ is significantly different from 0 at the 0.05 level.

1999). Qualitative interview evidence with disadvantaged women suggests that when this construct is explored in more depth, a more pessimistic picture emerges (unpublished MA dissertations, NUI, Galway) and this is in keeping with evidence that self-rated health is a global measure variously interpreted at individual level (Krause & Jay, 1994). Other qualitative Irish data suggest important generational effects in concepts of health and well-being (NicGabhainn et al., 1999) and particularly among older people, a strong reliance on the health care system, with a capacity to differentiate between determinants of ill-health and factors promoting health and well-being (MacFarlane & Kelleher, 2002).

The power of medical service eligibility to predict self-rated health most consistently is very interesting. We have shown elsewhere that measures of self-reported disease-specific morbidity and lifestyle are both strongly related to GMS status (Kelleher et al. in press; Friel et al., 1999), and this is an important contributory explanation. However, the inclusion of self-rated disease specific morbidity measures in the regression models did not significantly diminish the influence of GMS eligibility on self-rated health. GMS effects are age adjusted and also modified, as might be expected, by the inclusion in the model of educational status, for both men and women and in the case of men by employment status as well. However, even when all these factors are taken into account, GMS eligibility continues to be an important predictor. In many ways it is the most robust measure of actual income available, since it is rigorously means tested, suggesting that its persisting importance in the model is for this reason. There is reticence in Ireland to disclose actual income, which perhaps makes this our best composite proxy marker for disadvantage.

Unusually perhaps, there was no overall difference in mean self-rated health between men and women, though the multi-variate patterns differed somewhat in the final models. We deliberately examined two separate models, rather than simply adjusting for sex, in order to assess whether and how the patterns of inter-relationship between deprivation variables and health status might differ. GMS eligibility was a stronger predictor among women than men in the final model and employment status was more important for men than for women. In the 1958 United Kingdom birth cohort study, job security was a significant predictor of class differences in SRH for men, but not for women (Matthews et al., 1999). In Eastern Europe there are more marked gender differences in self-rated health patterns, but the economic burden on women differs considerably in those countries (Bobak et al., 2000). Ireland is also unusual by European Union standards in that there are still relatively low rates of marital breakdown and, among older respondents especially, formal work outside the home was not alone uncommon, but married women were in fact banned from public sector employment until the mid-1970s. At bivariate level, employed women of all ages had higher self-rated health, but it did not remain significant in the final model. Social class as a variable is difficult to interpret because it simply measures occupation, which may or may not act as a measure of income, economic discretion, status and power within societies and over time. We included models with and without this variable because of the low response rate to occupation-related questions, but it did not make appreciable difference.

It is now a consistent finding that educational status is a strong predictor of self-rated health (Mackenbach et al., 1994; Heistaro et al., 1996; Kawachi et al., 1999; Bobak et al., 2000). Educational status is age related in Ireland, presumably because free second level education became universally available after 1968 and has been identified by social commentators as one of the key factors in the country's more recent economic success.

The inter-relationship between the area and individual measures may be cautiously interpreted. Our intention, with limited available data at DED level, was to see whether any of the variation seen could be accounted for by contextual factors over and above likely compositional effects. Large-scale analyses in the United States have indeed shown that it is possible to connect individual-level health to the macro-social environment

(Subramanian, Kawachi & Kennedy, 2000). Our data confirm that individuals now tend to reside with people of similar socio-economic circumstances in Ireland, but the available measures compiled through the census in order to derive an area affluence score or a social cluster pattern are constructed from largely similar individual level data, with some overlap in variables considered. Though residence in an area of high affluence was associated at bivariate level with a difference in mean self-rated health, the multi-level analysis implies that this is explained by individual level variation. It is possible that this simply reflects a confounding effect since the variables considered in the composite score are similar, but is also true that outside the large cities communities are less segregated in social and economic terms than might be the case in more densely populated industrialized countries. Variations in standardised mortality ratios outside the large cities have traditionally been less marked than is the case in other countries (Howell et al., 1993). In a recent analysis at county level we demonstrated that between individual differences appeared more important and consistent (Kelleher et al., 2002). More recent analyses at district electoral division level do show that in Dublin, Belfast and the other large cities a more typical gradient in mortality is emerging, though occupation-defined variations continue to be paramount (Balanda & Wilde, 2001). Arguably what we are seeing is a shift from traditional patterns of rural deprivation and high rates of emigration but with strong social networks to a more characteristic model of widening socio-economic gradients in an increasingly urbanised society, where features of industrialisation and social breakdown go hand in hand. It will therefore be of importance to continue to model the relative effects of compositional and contextual factors in influencing health profile in the country as it continues through a period of unprecedented economic transition. The precise inter-relationship between health status and social position merits particular attention in this country for this reason and a newly established three generation cohort study will seek to deconstruct the relative importance of measures of social capital and support in influencing health outcomes in the context of both individual level and area disadvantage. In conclusion, these findings from the Republic of Ireland underline the need to take account of particular social context in different countries when assessing the inter-relationship between self-rated health and social variation.

Acknowledgements

The SLAN survey was funded by the Department of Health and Children, Republic of Ireland. Sharon Friel and Saoirse Nic Gabhainn received grant support from the Health Research Board of Ireland as part of the Unit on Health Status and Health Gain to develop the models used for this analysis. Joseph Tay is funded as part of the Human Impact Cluster of the Higher Education Authority cycle 2 scheme of support for the Environmental Change Institute. This paper was drafted by Cecily Kelleher during a Fulbright commission supported visting scholarship period to the United States of America. Cecily Kelleher is a steering committee member of the European Science Foundation funded Social Variations in Health Expectancy in Europe research programme. Helpful criticisms of earlier drafts were provided by Dr. Hanno Ulmer, Institute of Biostatistics, University of Innsbruck, Austria, Dr. Eamon O'Shea, Department of Economics, NUI Galway and Dr. Jennifer Balfour, Center for Epidemiology and Population Health, University of Michigan, Ann Arbor, USA.

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