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Short Report

# The effect of population movement on the spatial distribution of socio-economic and health status: Analysis using the Northern Ireland mortality study

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ABSTRACT

This paper examines the impact of population movement on the spatial distribution of socio-economic and health status in Northern Ireland. Five percent of the population cohort changed decile of deprivation between 2000 and 2001, resulting in a net gain in more affluent deciles and a net loss in more deprived areas. In addition, there was a net gain of relatively more affluent people in the more affluent deciles and a net loss of such people from more deprived deciles. However, this selective mobility had a minimal impact on the spatial distribution of health. More pronounced effects may be observed in longer periods of follow-up.



## 1. Introduction

Despite much rhetoric and research about health inequalities, a recent government report showed that the relative gap in life expectancy between England as a whole and the fifth of areas with the worst health and deprivation indicators was wider in 2004–6 than 10 years previously (Department of Health, 2008). The most common explanation for these increasing inequalities, is that health improvements among people living in affluent areas have occurred at a faster rate than for people in deprived areas. The government has identified the main challenge in meeting its 2010 health inequalities targets as ensuring that improvements in health in targeted groups and areas at least match the rate in the rest of the population (Department of Health, 2008). However, given that these inequalities are assessed at an area level, an alternative explanation for their persistence may be selective migration between areas: for example, if more deprived (and less healthy) people are likely to move to more deprived areas, and more affluent (and healthy) people move to more affluent areas, then the net result could be a widening of health inequalities between affluent and deprived areas (Connolly et al., 2007).

There is a wealth of evidence showing that there has been a net movement of people from deprived areas in recent decades (Brown and Leyland, 2009; Norman et al., 2005; O'Reilly et al., 2001) and that the propensity to migrate is greatest among the younger, better educated and more affluent individuals and households (Fielding, 1997; Leon and Strachan, 1993; O'Reilly and Stevenson, 2003). However, the impact of this movement on the spatial distribution of socio-economic and health status within countries remains unclear. Boyle et al. (2002) investigated whether migration patterns between 1990 and 1991 in Scotland influenced the relationship between health and deprivation. One assertion was that migration could influence the relationship between health and deprivation if it was "ill" people who moved towards deprived areas and the healthy who moved towards affluent areas. However, they found this not to be the case and concluded that migration did not influence the relationship between health and deprivation in a consistent way. van Lenthe et al. (2007), examining the health characteristics of migrants in the Netherlands, found health and health related behaviour to be weakly associated with migration and concluded that selective migration would not contribute substantially to neighbourhood inequalities in health and health related behaviour. However, Brimblecombe et al. (1999, 2000) found that migration accounted for all of the inequalities in mortality observed between districts in Britain. While Connolly et al. (2007) found that approximately half of the increase in inequalities in mortality observed between areas in England and Wales between 1991 and 2001 were due to selective migration.

The aim of this paper is to determine whether migration between 2000 and 2001 in Northern Ireland influenced the spatial distribution of socio-economic and health status, and therefore potentially contributed to widening health inequalities.

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## 2. Methods

The Northern Ireland Mortality Study (NIMS) is a prospective record linkage study, based on the 2001 Census returns for the whole enumerated population, to which subsequent registered deaths have been linked. This forms a longitudinal study, with 94% of all deaths occurring in the 5 year post-census period linked to a census return. Details of the linkage process are described elsewhere (O'Reilly et al., 2008). These data were anonymised, held in a safe setting by NISRA and made available to the research team for this study.

Change of address was assessed from a question on usual address in the census. Respondents were asked if their usual address on the census day was different from their usual address exactly 1 year before. If the answer was in the affirmative, they were then asked to provide their previous address, including postcode. It was possible, therefore, to use the census to examine the magnitude and direction of movement over this period. Those without a valid address or postcode, those aged less than 1 year at the 2001 census and those living outside of Northern Ireland in 2000 were excluded from the analysis.

An indicator of area deprivation was derived using the income domain (the proportion of the population in a super-output area (average population 1900) living in households in receipt of means-tested benefits) of the Northern Ireland Multiple Deprivation measure (Northern Ireland Statistics and Research Agency, 2005). Super-output areas were ranked by deprivation level and divided into deciles containing approximately equal proportions of the population. Individuals were assigned to a deprivation decile in both 2000 and 2001, and any person allocated to a different decile at the two time periods was assumed to be a socio-economic migrant.

All attributes of the cohort members were as described on the census record. The net gain or loss of people from the deprivation deciles by selected socio-economic characteristics was assessed. These socio-economic indicators included housing tenure (owner occupiers and public sector renters), household car access (access to two or more cars and no car access) educational attainment (to degree level and no formal education), and National Statistics Socio-economic Classification (NSSEC) (higher and lower professionals and routine occupations). As neither education nor NSSEC were coded for those aged 75 or older in the 2001 UK Census, the analysis was restricted to those aged less than 75.

The analysis consists of three sections. Firstly, the extent and direction of movement within the deciles of deprivation was assessed. Secondly, the impact of movement on the spatial distribution of socio-economic status was examined. Finally, to determine if migration plays a part in increasing area health inequalities, the analysis examines mortality levels, as assessed by place of residence in 2000 and 2001 (before and after movement). Directly standardised death rates (according to the European standard population) were derived for each decile of deprivation in both 2000 and 2001, and the extent of inequality was assessed using the slope and relative index of inequality (Regidor, 2004).

## 3. Results

The cohort included just less than 1.5 million people, of whom 8% changed address between 2000 and 2001; 5% recorded a change in decile of deprivation by changing address. Socio-economic migration was more common at the younger ages, with 10% of those aged 25–34 changing decile, compared to 2% of those aged 65–74. Between 2000 and 2001, there was a net population gain to the least deprived deciles and a net loss in the more deprived (Fig. 1). Most socio-economic movement occurred between adjacent deciles; for example, of the 7664 people who left the least deprived decile between 2000 and 2001, 25.5% moved to the adjacent decile, while only 2.2% moved to the most deprived decile.

Table 1 shows the net gain/loss of individuals to the quintiles of deprivation between 2000 and 2001 by selected socio-economic characteristics. Due to concerns with tabular disclosure

**Table 1**
Net gain (loss) of individuals (aged less than 75) with various socio-economic characteristics from each quintile of deprivation between 2000 and 2001: gain (loss) is caused by the movement of individuals between quintiles.

| Indicators of SES | Least deprived | 2 | 3 | 4 | Most deprived |
|---|---|---|---|---|---|
| **Housing tenure** | | | | | |
| Owner occupier | 1605 | 888 | 588 | −554 | −2527 |
| Social renter | −811 | −548 | −1 | 457 | 903 |
| **Car ownership** | | | | | |
| 2 or more cars | 1330 | 538 | −72 | −581 | −1215 |
| No car | −844 | 459 | −56 | 187 | −254 |
| **Education (25–74 year olds)** | | | | | |
| To degree level or higher | 294 | −24 | 66 | −41 | −295 |
| No qualifications | 141 | 146 | 363 | −104 | −546 |
| **NSSEC (16–74 year olds)** | | | | | |
| H/L professional | 359 | 185 | 105 | −139 | −510 |
| Routine | 45 | 115 | 335 | −26 | −469 |

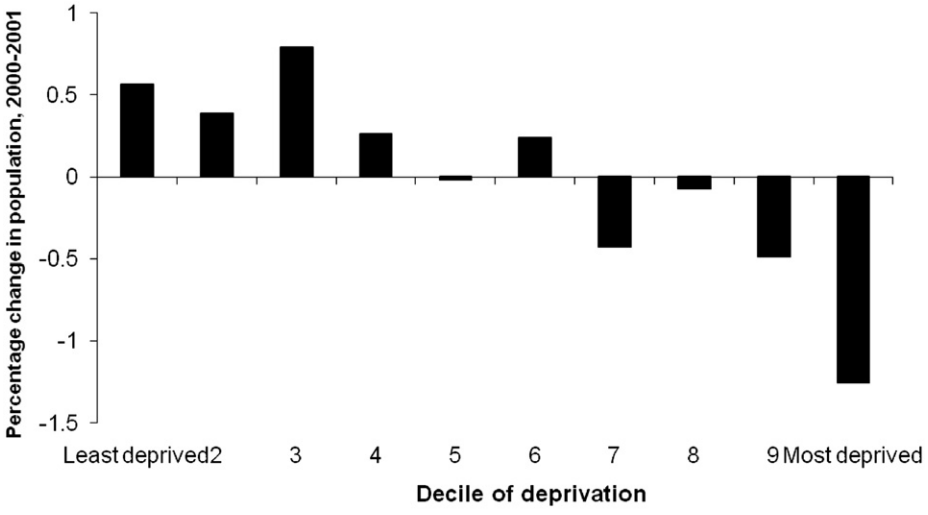


**Fig. 1.** Percentage population increase/decrease for each decile of deprivation between 2000 and 2001.