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Increasing inequalities in health: Is it an artefact caused by the selective movement of people?

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Abstract

Changes in health socio-economic inequalities are currently measured by comparing the mortality gradient across aggregates of small administrative areas at two points in time. However, this methodology may be flawed as it ignores population movement, which previous research has shown to be selective, with a net loss of the more affluent (and possibly healthier) residents from deprived to more affluent areas. This paper investigates whether selective migration contributed sufficiently to the observed socio-economic gradients in mortality in England and Wales throughout the 1990s so as to invalidate the current method of monitoring health inequalities. The ONS Longitudinal Study for England and Wales was used to calculate directly standardised mortality rates (DSR) by decile of deprivation in 1991 and 2001. The DSRs for 2001 were calculated twice, once according to decile of residence in 2001, and also according to the original decile in 1991. Selective migration was found to make an important contribution in explaining increases in inequalities between areas, accounting for about 50% of the increase for those aged less than 75. At the older age groups, however, selective migration was responsible for a narrowing of mortality differentials over time. These results indicate that caution should be exercised when using repeated ecological studies in assessing the extent of changes in inequalities over time.

Keywords: Inequalities; Mortality; England; Wales; Selective migration; Socioeconomic gradients

Introduction

People living in deprived circumstances consistently show higher levels of morbidity and mortality than those resident in more affluent circumstances (Achenson, 1998; Mackenbach, Kunst, Cavelaars, Groenhof, & Geurts, 1997; Townsend, Whitehead, & Davidson, 1992). Many studies investigating socio-economic inequalities in health have used an ecological design (Carstairs & Morris, 1991; Townsend, Phillimore, & Beattie, 1988), a valuable source of information when individual level data are not available. Researchers have been given some reassurance regarding the recognized limitations of ecological studies (Morganstern, 1982) by the demonstration that the relationships between socio-economic factors and health at an area level also pertain at an individual level (MacRae, 1994; Sloggett & Joshi, 1994). No such assurance is available, however, for the most widely used methodology for assessing *changes* in health inequalities. This is an extension of the ecological design and generally involves using the same

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assessment tools to produce a snapshot of health of areas at two points in time and comparing for any changes. However, the approach may be seriously flawed as it ignores possible differences arising from the selective movement of people. Davey Smith, Shaw, and Dorling (1998) commented that population change is an important parameter that has not been sufficiently investigated in relation to spatial patterns of mortality.

This has important implications as the repeat ecological design is the methodology used to demonstrate a widening of socioeconomic and health inequalities between areas, both in the UK (Dorling, 1997; Dorling, Davey Smith, & Shaw, 2001; McCarron, Davey Smith, & Wormsley, 1994; McLoone & Boddy, 1994; Phillimore, Beattie, & Townsend, 1994; Shaw, Davey Smith, & Dorling, 2005; Staines & Cartwright, 1995) and elsewhere (Geronimus, Bound, & Waidmann, 1999; Michelozzi et al., 1999). It is also the way that the Departments of Health in England and Wales assessed the progress of their policies to reduce health inequalities (Department of Health, 2005). The justification for this is that it is a fair comparison as the areas (or groups of areas) are unchanged and the same instruments have been used to assess the population. However, such comparisons may not be reasonable if the populations being compared have changed, for example through in- or out migration. Failure to consider migration effects could lead to incorrect conclusions being drawn about the effectiveness of policies to reduce inequalities in health. For example, if policies directed at poorer areas were successful at improving health, and at the same time many of those who most benefited from these policies selectively migrated to 'nicer' areas then later re-examination of the health status of the deprived areas might lead to an incorrect conclusion that the policy initiatives had not worked, when in fact it was 'residualisation' (i.e. sicker people left behind), resulting in worsening health measures for that community.

There is now a wealth of evidence showing that there has been a net movement of population from deprived and towards more affluent areas in recent decades (Norman, Boyle, & Rees, 2005; O'Reilly, Browne, Johnson, & Kelly, 2001) and that the propensity to migrate is greatest amongst the younger, better educated and more affluent individuals and households (Fielding, 1997; Leon & Strachan, 1993; Meen, Gibb, Goody, McGrath, & MacKinnon, 2005; O'Reilly & Stevenson, 2003; Richey, 1976). The result of such selective migration has been an increasing depopulation of deprived areas and increasing socio-economic polarization between areas over time. However, the evidence showing that selective migration has played a significant part in the observed increases in inequalities in health between areas is less clear (Boyle, 2004).

Fox, Goldblatt, and Adelstein (1982) using the Office for National Statistics Longitudinal Study (ONS LS) to examine the possible role of selective migration in determining the geographical distribution of mortality, confirmed the presence of health selection processes that would have lead to some minor widening of the regional gradients in mortality. These processes were largely driven by selective movement of healthier younger people but there was also evidence of migration of an older dependency group who were moving for reasons of care and support. However, Strachan, Leon, and Dodgeon (1995) concluded that the geographical pattern of mortality from cardiovascular disease cannot be attributed to selective migration as the mortality ratio of the high mortality areas was unchanged even when all the migrants had been "sent home" to their earlier places of residence. More recently, Brimblecombe, Dorling, and Shaw (1999) by 'replacing' migrants within the British Household Panel Study to their region of birth and examining the subsequent distribution of mortality, concluded that migration explained all of the observed inequalities in mortality between districts; though it has been pointed out that the overall number of deaths analysed in that study was relatively small (Boyle, 2004). In a follow-up paper Brimblecombe, Dorling, and Shaw (2000) reanalyzed the population movements for larger geographical areas and showed that the numbers of migrants between regions were too small to significantly influence mortality patterns. Norman et al. (2005) used the ONS LS to show that between 1971 and 1991 there was a net flow of healthy migrants from deprived areas and towards less deprived areas within England and Wales, with the effect of raising mortality in the origins and lowering them in the destinations. On the other hand, in a separate paper, Boyle, Exeter, and Flowerdew (2004) concluded that the widening mortality gap in Scotland between 1981 and 2001 could not be explained simply as an artifact of population change.