Are health inequalities between differently deprived areas evident at different ages? A longitudinal study of census records in England & Wales, 1991-2001

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Abstract

The notion that mortality inequalities between differently deprived areas vary by age is logical since not all causes of death increase in risk with age and not all causes of death are related to the gradient of deprivation. In addition to the cause–age and cause–deprivation relationships, population migration may redistribute the population such that the health–deprivation relationship varies by age.

We calculate cross-sectional all cause mortality and self-reported limiting long-term illness (LLTI) rate ratios of most to least deprived areas to demonstrate inequalities at different ages. We use longitudinal data to investigate whether there are changes in the distribution of cohorts between differently deprived areas over time and whether gradients of LLTI with deprivation also change.

We find similar deprivation inequalities by age for all cause mortality and self-reported health with less inequality for young adults and the elderly but the greatest inequalities during mid life. Over time there are systematic movements of cohorts between differently deprived areas and associated increases and decreases in the gradient of LLTI across deprivation. It seems likely that population migration does influence inequalities by age. Further work should investigate whether the situation exists for other morbidities and, to better inform public health policy, whether restricting summary measures of area health to ages between 30 and 60 when inequalities are greatest will highlight between area differences.

Key words: Health Inequalities; Health Selective Migration; ONS Longitudinal Study; England & Wales Census

Key points

- Evidence exists for equalisation in mortality risk between differently deprived areas for young adults
- For both all cause mortality and self-reported limiting long-term illness we find inequalities by age with least inequalities for young adults and the elderly but most inequality in mid life
- Over time as people move between different area types typical for their life stage, cohorts are redistributed across deprivation in ways which change the gradient of health at each age
- Since inequalities are greatest during mid life, to better inform public health policy, further work should restrict summary measures of health to ages between 30 and 60 to highlight between area differences

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Introduction

The notion that mortality inequalities between differently deprived areas vary by age is logical since not all causes of death increase in risk with age and not all causes of death are related to the gradient of deprivation. Dibben and Popham (2013) investigate these phenomena and provide a compelling argument that in late adolescence, heightened exposure to the risk of land transport accidents increases levels of mortality in the least deprived areas such that inequalities disappear at this age. Using a similar framework, Green (2013) also found an equalisation of mortality differentials in early adulthood but that mortality rates for transport accidents declined during the 2000s in less deprived areas. He concludes (p. 98) that "social inequality is not consistent across the life course and during adolescence there is a clear decline in the level of inequality" and that "equalisation is only truly evident amongst the very elderly."

In addition to the interaction between the cause–age and cause–deprivation relationships, it may be that population migration redistributes the population over time such that the health–deprivation relationship varies by age. This proposition is based on: the distinctive profile of age-specific migration rates (Raymer & Rogers, 2008; Rogers et al., 2010); that place characteristics are important determinants of migration (Walters, 2000; Dennett & Stillwell, 2011); and that the factors which potentially 'push' or 'pull' migrants between different places vary with age and stage in the life course (Boyle et al., 1998; Champion et al., 1998; Champion, 2005). Moreover, since the migration process is health selective (Norman et al., 2005), this can lead to changes in overall health rates (both morbidity and mortality) at the geographic origin from which people have come and at their destination. Over time, healthy people tend to move to less deprived locations and less healthy people to move into, or be non-migrants in more deprived locations. As a result, Norman et al. (2005) find that rates of mortality and of self-reported limiting long-term illness (LLTI) are lower in less deprived areas and higher in more deprived areas than they would have been if people had stayed in the same locations. These patterns are noted in other work but there are variations of findings in relation to geographic scale (Brown & Leyland, 2010) and the time frame of studies (Boyle et al., 2002; Curtis et al., 2009; Connolly et al., 2011). Whilst population movements away from more deprived locations tend to exaggerate overall inequalities between areas (Norman et al., 2011), not all studies find this to be the case (Popham et al., 2011). In terms of health differences between areas by age, the evidence is also mixed with Kibele and Janssen (2013) determining that mortality variations between areas are exaggerated by migration whilst other studies (Martikainen et al., 2008; Jongeneel-Grimen et al., 2011 & 2013) find that health selective migration does not enlarge inequalities.

The previous cross-sectional (Dibben & Popham, 2013) and time-series (Green, 2013) analyses are important because they help our understanding of which causes of death have distinctive relationships with age and deprivation. What we add here is the use of morbidity, since self-reported health can have greater area deprivation inequalities than mortality (Norman & Bambra, 2007), and through the use of a longitudinal approach an understanding of the demographic drivers which lead to differences in population structures (Rees et al., 2013).

Therefore, in this paper we investigate whether inequalities between differently deprived areas vary by age and the role migration might play. First we use cross-sectional data to identify inequalities by age-group for all cause mortality and then see whether a similar situation exists for morbidity inequalities using self-reported limiting long-term illness (LLTI). After this we use longitudinal data to show how population by age is redistributed across differently deprived areas over time and how health inequalities then vary by age. Based on the life course migration literature and on texts more specifically investigating health selective migration, the following scenarios may play out to affect health inequalities by age between differently deprived areas:

- Moves of healthy young adults from less to more deprived areas;
- Moves of healthy middle aged adults (and their children) from more to less deprived areas;
- Moves of the elderly will be more of a mixed picture in terms of changes between differently deprived areas and in health status.

Methods

Cross-sectional analysis

Initially, we adopt a similar approach to Dibben and Popham (2013) in that for England and Wales, we use ward level vital statistics on mortality for persons by five year age groups for 2000-02 as numerators and 2001 mid-year estimates as denominators together with Carstairs scores and population weighted quintiles calculated using 2001 Census data (Norman, 2006). We aggregate the mortality and population data across the deprivation quintiles and calculate five year age-specific mortality rates. We then calculate mortality rate ratios of most to least deprived areas (quintile 5 : quintile 1) and 95% confidence intervals (Bland, 2000).

In terms of morbidity, the 1991 Census was the first since 1911 to include a direct question about each respondent's health and, with a minor wording change, the question was repeated in the 2011 Census to read: "Do you have any long term illness, health problem or disability which limits your daily activities or the work that you can do? Include problems which are due to old age," answer: Yes/No. We use ward level data for England & Wales with responses to the 2001 Census question on 'limiting long-term illness'. As with mortality, we use limiting long-term illness data as numerators and mid-

year estimates as denominators and aggregate these across the deprivation quintiles and calculate ratios of five year LLTI rates for the most to least deprived quintiles.

Longitudinal analysis

Having established whether there are cross-sectional inequalities by age-group, we aim to determine whether population migration between differently deprived places may affect age-health-deprivation relationships. The Office for National Statistics (ONS) Longitudinal Study (LS) allows us to track a 1% sample of the England and Wales population over time to see whether there is age-specific sorting of population between deprivation quintiles and changes in health inequalities between the 1991 and 2001 Census time points. As a health outcome, we use self-reported limiting long-term illness in 2001. Whilst mortality is recorded in the LS, deaths at young ages are rare events and as this is a sample, reliable results cannot be achieved across all age-groups. Electoral wards are commonly used in ecological health analyses (Norman, 2010) so we have attached to each LS member's record the quintile of Carstairs deprivation of their area in 1991 and 2001. To enable comparison over time and account for boundary changes, we use deprivation for 1991 wards but converted to the 2001 ward geography (Norman, 2010) and link 1991 LS member records to the 2001 ward geography (Norman & Riva, 2012). Since population weighted quintiles of Carstairs scores are used, 20% of the LS sample fall into each deprivation quintile at each census year though we expect the distributions to vary by age.

There are around 500,000 persons in the LS at any one census. We use a sub-sample of persons present at both the 1991 and 2001 Censuses and exclude those reporting being permanently sick or disabled in 1991 (to avoid prior poor health selection effects) and communal establishment residents (since the locations of these will bias migration destination choice). This sub-sample definition is in line with previous LS studies (Boyle et al., 2004; Norman et al., 2005) and comprises 389,436 persons. Note that in the results reported here, a change in population quintile for a person in the LS can occur when somebody changes their residential location by subnational migration or for a non-migrant whose area becomes more or less deprived over time. Whilst the former scenario is more common (76%), both types of change are related to the reporting of LLTI or risk of mortality (Boyle *et al.,* 2004; Norman *et al.,* 2005).

We investigate changes in deprivation circumstances between 1991 and 2001 for each 10 year cohort by aggregating counts of persons across the deprivation quintiles in which people were living in 1991 and where they were living in 2001. This will reveal whether, as each cohort ages by 10 years, people become differently distributed across deprivation quintiles. For each 10 year cohort, using logistic regression we model the likelihood of reporting LLTI in 2001 including the deprivation quintile in both 1991 and 2001 to control for combined deprivation effects. We report the results as odds ratios of

reporting LLTI with the reference category being the least deprived quintile 1 with which the likelihoods in the other quintiles are compared.

To determine whether migration has led to changes in inequalities, the longitudinal data allow us to calculate age-specific limiting long-term illness rates with migrants at their destinations and compare these with rates having returned migrants to their origins. Using this 'put people back' approach, migration has been found to account for overall mortality differences over time (Brimblecombe et al., 1999 & 2000) and for age, in explaining mortality inequality increases for persons less than 75 years of age but not for older persons for whom a narrowing of inequalities has been found (Connolly et al., 2007). Our LS extract allows us to analyse the subsample located by their deprivation quintiles in which they were living in both 1991 and 2001. Thus, we calculate rates of reporting LLTI in 2001 for each age-group as if no migration had occurred (i.e. by 1991 deprivation quintiles) and compare these with rates when the location of LS members has changed (i.e. by 2001 quintiles).

Results

Investigating cross-sectional inequalities by age

Figure 1 shows inequalities for 2000-02 measured by five year mortality rate ratios (RRs) of most to least deprived quintiles. In the first few years of life, the most deprived areas have considerably higher mortality rates than the least deprived areas (RRs 2.56 for age 0-4 and 2.52 for age 5-9). The inequality reduces then to approach equality by age 20-24 (RR 1.14) before increasing during mid life (largest RR 2.37 for age 55-59). From age 55-59 inequalities reduce with increasing age to parity by age 85+ (RR 1.01). Although our data: have less detailed age information (five year, not single year); are for persons (rather than males and females); have a different time reference (2000-02, not 1997-99); and a different deprivation measure (Carstairs, not Index of Multiple Deprivation), the age profile of inequalities shows close correspondence to Dibben and Popham (their Figures 1e & f).

< Figure 1 about here >

Figure 2 shows a very similar pattern for LLTI in 2001 as for mortality but with somewhat less inequality for the youngest ages (RRs 1.86 for age 0-4 and 1.79 for age 5-9), slightly less of a move towards equality for young adults (RR 1.43 for age 20-24) but clear inequalities during mid-life (largest RR 2.50 for age 45-49) and a reduction towards parity with increasing age (down to RR 1.08 for age 85+). The confidence intervals for the LLTI rate ratios are narrower than those for mortality because the latter involves fewer events. For example, for adults aged 20-24 during the three years 2000-02 there were 726 deaths in wards categorised in quintile 1 (the least deprived) and 1,492 deaths in quintile 5 (the most deprived). In the 2001 Census, 29,099 adults aged 20-24 reported LLTI in quintile 1 and 48,897 in quintile 5.

< Figure 2 about here >

Investigating longitudinal inequalities by age

For 10 year cohorts, Figure 3 illustrates the distribution of persons across deprivation quintiles in 1991 and when they are ten years older in 2001 (the graphs on the left). Then the odds ratios of reporting LLTI in 2001 are shown for the deprivation quintiles in which the cohort lived in both 1991 and 2001 (the graphs on the right). The reference category is the least deprived quintile 1.

< Figure 3 about here >

Figure 3a shows that the distribution of persons aged 0-9 in 1991 increases with rising deprivation. By 2001 there is a very even distribution across deprivation but slightly lower representation in quintile 5, the most deprived areas. For the reporting of LLTI in 2001, there is a low gradient of odds ratios in 1991 which steepens for 2001 due to the redistribution of people across deprivation. As the cohort tends to be in less deprived areas in 2001 there is a concomitant change in the distribution of health.

For persons aged 10-19 in 1991, Figure 3b shows a fairly even distribution of persons across deprivation which by 2001 has changed with proportionately more people in the more deprived areas. The gradient of odds ratios across deprivation in 1991 and 2001 for this cohort only changes marginally as these relatively healthy people move from less to more deprived locations. Rather than an increase in inequalities as with the youngest cohort, there is a stagnation.

For mid life, Figures 3c to f each tell a similar story. People are changing locations whereby there is a general move away from the more deprived locations and into less deprived areas. Particularly for those aged 20-29, 30-39 and 40-49 in 1991, the gradients of the odds ratios of reporting LLTI increase substantially comparing the 2001 gradient with that relating to where people were living in 1991. There is less of a difference in the 1991 and 2001 LLTI gradients for persons aged 50-59 in 1991.

For persons aged 60-69 and 70-79 in 1991, there is a slight reversal of the movements of population with a relative loss of persons in the least deprived areas and an accumulation in the deprivation middle ground. There is something of a reduction in the 2001 odds ratio gradient compared with 1991 for the younger of these two cohorts. For persons aged 85+ in 2001, the gradient of odds ratios across deprivation is effectively flat with no significant differences between quintiles.

Does migration change the inequalities by age?

Figure 4 illustrates ratios of LLTI rates in most to least deprivation quintiles by people's locations in 1991 and in 2001, by their age in 2001 when they reported LLTI. Even though some deprivation mobility was noted above for those who become aged 10-19 in 2001 there is no significant difference in health by 1991 and 2001 deprivation circumstances. Whilst there is the general movement of population from less to more deprived areas for young adults, this does not change the inequalities for this cohort which is no different for 1991 and 2001 locations. For the 30-39 cohort though there is a large difference in the inequality which would have been the case had people stayed in their 1991

quintile of deprivation compared with their circumstances in 2001. It is a similar, but not so marked situation for those aged 40-49 in 2001. The differences for persons aged 50-59 and 60-69 are slight and are negligible for the oldest two cohorts.

For the transitions between the distribution of people across 1991 deprivation and the situation in 2001, it appears that it is only redistributions of people becoming aged 30-39 and 40-49 which lead to a significant difference in the inequalities by age in limiting long-term illness. So is this enough to change the overall inequality? The all ages (crude) rate ratio (most to least deprived) with LS members at their 1991 locations is 1.43 (95% confidence interval 1.41-1.46) and at their 2001 locations is 1.63 (CI 1.60-1.65). To control for the changing age structure we calculate standardised illness ratios (SIRs) for the deprivation locations of LS members in 1991 and in 2001. The quintile 5 : quintile 1 SIR ratios increase from 1.67 in 1991 to 1.76 in 2001. We can therefore conclude that health inequalities did widen as a result of selective sorting by age across deprivation quintiles.

Discussion

Our cross-sectional analysis of differently deprived wards in England and Wales reveals inequalities by age for both all cause mortality and for limiting long-term illness. The patterns are similar for both of these health outcomes with greater differences in rates between most and least deprived areas for children and middle aged adults and less differences in rates for young adults and the very elderly.

Tracking cohorts for their distributions across differently deprived areas over time shows that those aged 0-9 have a shift from more to less deprived areas and this is associated with an increased gradient of health (LLTI) but not sufficient to lead to significant changes in rate ratios. The general movement towards more deprived areas by young adults leads an accumulation of relatively healthy people in more deprived areas and thus a change towards equalisation of rate ratios. The changes in distributions of people in their 30s and 40s from more to less deprived areas leads to exaggerations in health inequalities sufficient to change the overall rate ratios across all ages despite countercurrent movements of the elderly reducing inequalities at older ages. Out findings for LLTI are consistent with the situation for mortality found by Connolly et al. (2007) and the switch in general direction of population distribution across differently deprived areas could help explain the ‘kink’ in age-specific LLTI curves around retirement age identified by Marshall and Norman (2013).

At an individual level, the life-course perspective suggests that health inequalities result from cumulative exposures to different contextual conditions and variations in behavioural and psychosocial risks (Berney et al., 2000; Curtis et al., 2004). Childhood circumstances can influence adult health (Power et al., 1996) and living and working conditions for adults can affect health in years following retirement (Berney et al., 2000). People who live in differently deprived areas at different

stages of their lives and for how long will accrue health (dis-) benefits (Berney et al., 2000; Boyle et al., 2004). At a population level, whilst the potential for migration to affect health rates at both origin and destination has long been recognised (Welton, 1872), only relatively recently has this been specifically explored. Bentham (1988) proposed various scenarios within which people, in relation to their health, might respond in their migration behaviour to health hazards, environmental conditions and their need for care and that health rates for areas might be affected. Subsequent research proposed that areas which attract migrants from other area types and lose few migrants will in the long run become healthier populations (Verheij et al., 1998). To determine the effect of migration on health rates, returning migrants to their origin location at an earlier time point has been found to account for differences in mortality rates between destination areas at a later time point (Brimblecombe et al., 1999; 2000).

Norman et al. (2005) picked up on these studies and defined a framework to explore whether there is systematic sorting of people which contributes to the area-level relationships between health and deprivation. This work determined that since those persons moving to less deprived areas had better health than those moving to more deprived areas the conclusion was that migration at least maintained and even exaggerated the relationship between health and deprivation. In terms of health-selective migration, Boyle and Norman (2009) identified that the majority of migrants are young and relatively healthy but that some persons may or may not move because of their health. More advantaged people tend to migrate to or between less deprived, more attractive locations and less advantaged people, through lack of choice, tend to drift into (or be trapped in) more deprived locations.

Various studies have sought to determine whether selective migration between areas changes health inequalities by age over time but with mixed findings, perhaps due the approach adopted. In 1998, Verheij et al. defined frameworks whereby: (1) the characteristics of people who move in different directions (with respect to area type) should be compared; and (2) the relative health of movers and stayers can be assessed. Studies which adopt the latter comparison tend to conclude that health selective migration does not enlarge inequalities (e.g. Martikainen et al., 2008; Jongeneel-Grimen et al., 2011 & 2013). This approach is analogous to the social mobility research which finds that social class gradients in health are constrained not exaggerated by mobility (e.g. Blane et al., 1999). Boyle et al. (2009) identify, however, that it is the moves in different directions which should be compared (like Verheij et al.'s first framework) rather than the comparison of those who move with those who they join. The 'put them back' framework also tends to allow clearer conclusions about whether migration has led to health change. In this way, Kibele and Janssen (2013) compare mortality rates if migration did or did not occur and do find significant differences between areas.

In terms of the work report here, the 'put them back' approach does not allow us to know how much difference there is in people's LLTI reporting from only being exposed to 1991 deprivation rather than combinations of 1991 and 2001 area deprivation. It is likely that experiencing improving deprivation circumstances leads to better health and *vice versa* (Boyle et al., 2004) so that some of the health advantage in mid-life can be presumed to accrue through being in less deprived areas for a time. In terms of interpreting the results, we should also remind that our LS extract is selective by good health in 1991 and by survival to 2001, so is a relatively healthy sample. Further, the study sample comprises household residents and some variations in results may be found if communal establishment residents were included. Also, whilst most of the changes in deprivation quintile of residence is because people have migrated from origin to destination, some changes occur for non-migrants whose location became more or less deprived over time. We should note that the census derived information on limiting long-term illness is self-reported and potentially influenced by subjective factors on question interpretation and different views on what constitutes a 'limiting' or a 'long term' illness (Marshall & Norman, 2013). Answers to questions for children will be their parent's view and there may be changes at a subsequent census when people later answer the question for themselves.

Dibben and Popham (2013) show that not all causes of death increase with age and not all causes of death are strongly related to deprivation. The same is true for different morbidities with, for example, visual impairment less related to age than hearing impairment and especially locomotor disability (Marshall et al., 2013). The gradient of health across different area types is steeper for incapacity benefit claims than for census-derived health measures and for mortality (Norman and Bambra, 2007) and people in more deprived areas are less likely to adopt good health related behaviours (Lakshman et al., 2010). Here we used a general measure of self-reported health but the situation may not be the same for other health outcomes whether self-reported, professionally diagnosed or from administrative sources. There may well be different redistributive potential for health conditions which relate more or less strongly to area deprivation and to health-related circumstances which restrict, enable or necessitate migration to an alternative location. Further work should use age-specific rates of different morbidities aggregated across deprivation quintiles to explore whether inequalities are evident at all ages for different illnesses. Given the specific mortality differences found for males and females (Dibben and Popham, 2013; Green, 2013), cause-specific morbidity rates should also be disaggregated by sex.

The migration literature in the late 20th and early 21st Centuries identifies 'remarkably persistent regularities' in the profiles of age-specific migration rates (Rogers et al., 2010: 10) and consistent patterns of movements between different origin and destination types at different life stages (Champion, 1989; 2005). The work reported here allows us to propose that the movements between differently deprived areas through the life course will lead to variations in health inequalities at

different ages. The movement of ill migrants from more to less deprived areas and resulting amelioration of the gradient of overall health rates across deprivation has been noted previously and presumed to be poor health selection of persons moving for care related reasons (Norman et al., 2005). However, the movement of young adults from less to more deprived areas is known (Smith, 2002), but the effect this has to reduce health inequalities has not been discussed. Exaggerations of inequalities appear to be driven by movements of persons in mid-life who change their residential locations from more to less deprived areas. This is not to say that policy should seek to reduce migration but we do need to understand that health inequalities by age may persist because of systematic demographic patterns as people live in different types of places at different stages in the life course.

The work by Dibben and Popham (2013) and Green (2013) is important because it helps our understanding of which causes of death have distinctive relationships with age and deprivation such that a naïve area-based analysis might lead to a false interpretation. For all cause mortality or for an outcome such as self-reported health, all age or premature standardised measures for areas may be used with the latter invariably having a stronger relationship with deprivation than the former. This may be due to the movements of elderly away from less deprived areas. Since the inequalities in health across deprivation appear to be driven by movements of persons in mid life, a summary measure restricted to ages from 30 to 60 is likely to reveal those areas most in need of targeting by health services.

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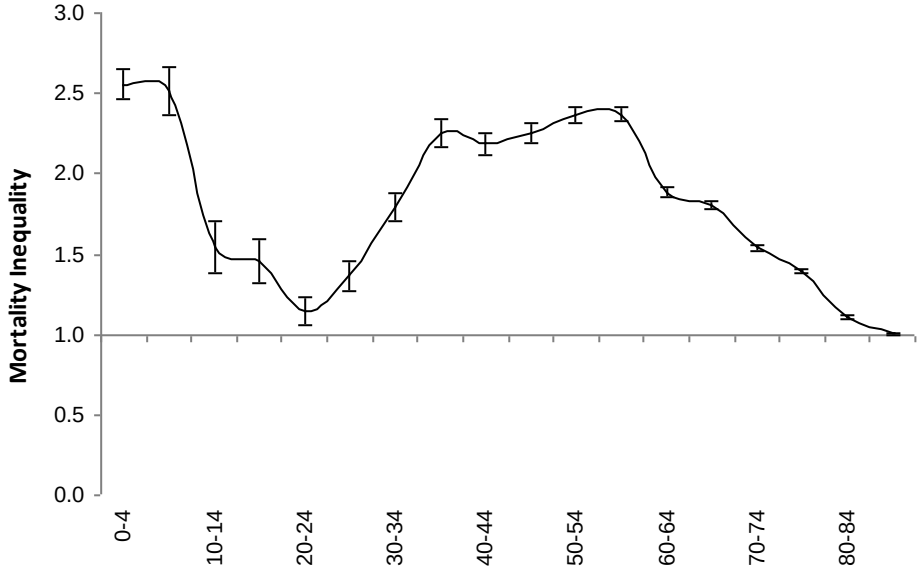
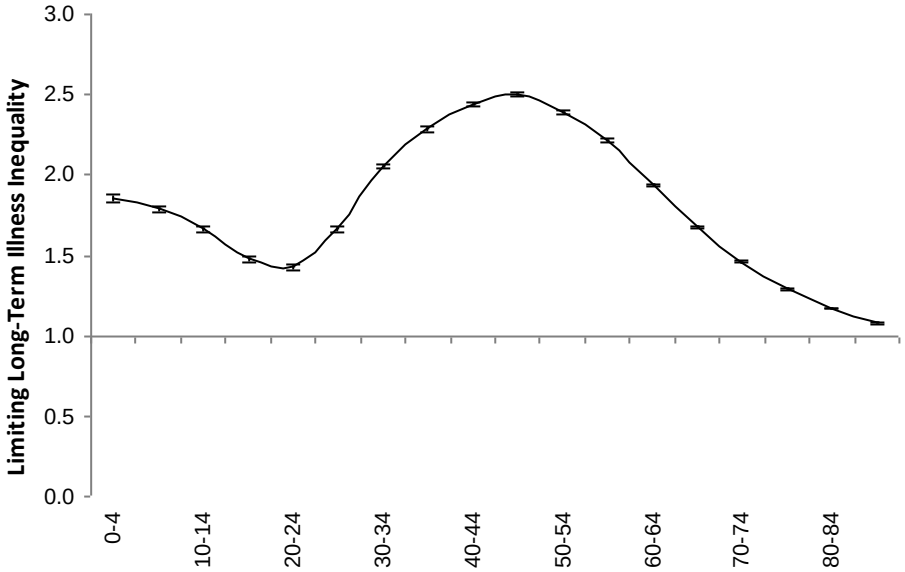
Figure 1: Rate ratios (and 95% confidence intervals) of mortality in 2000-02 for England & Wales by five year age groups for persons in the most deprived quintile to least deprived quintile



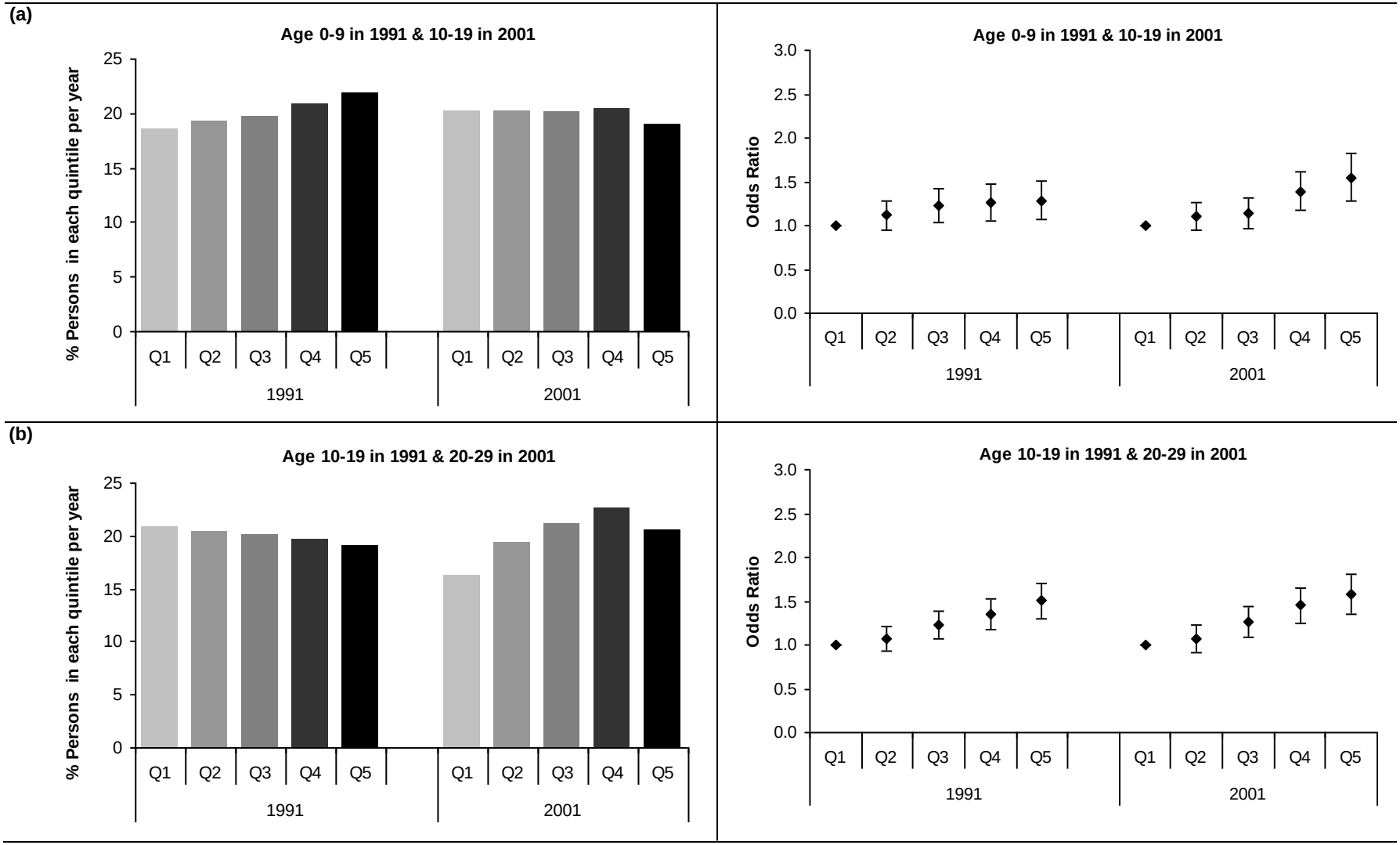
Note: Authors' calculations based on Vital Statistics and mid-year population estimates data

Figure 2: Rate ratios (and 95% confidence intervals) of limiting long-term illness in 2001 for England & Wales by five year age groups for persons in the most deprived quintile to least deprived quintile

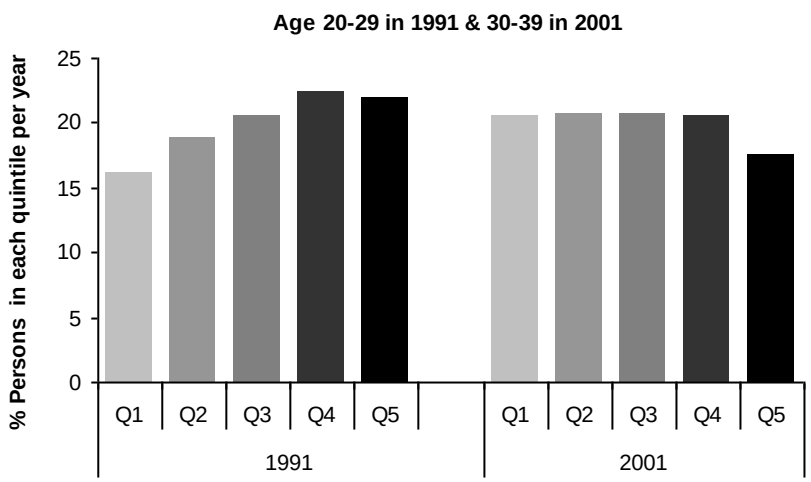


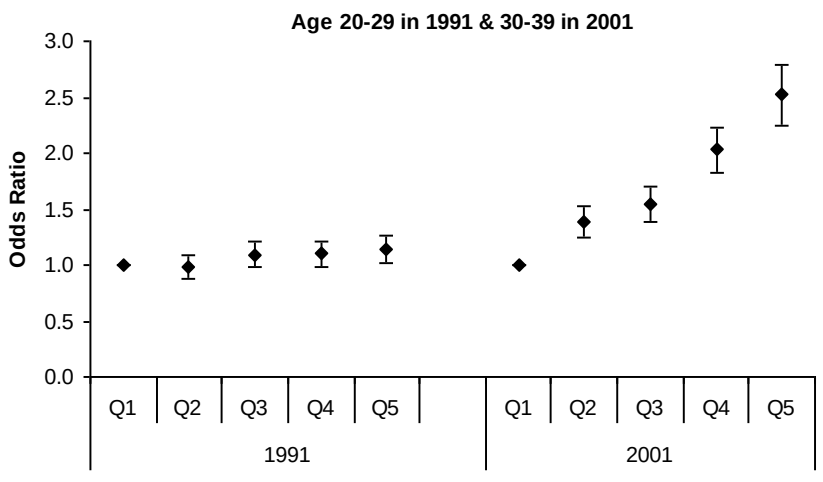
Note: Authors' calculations based on 2001 Census and mid-year population estimates data

Figure 3: Distribution of cohorts across area deprivation and likelihood of reporting limiting long-term illness in 2001, England & Wales

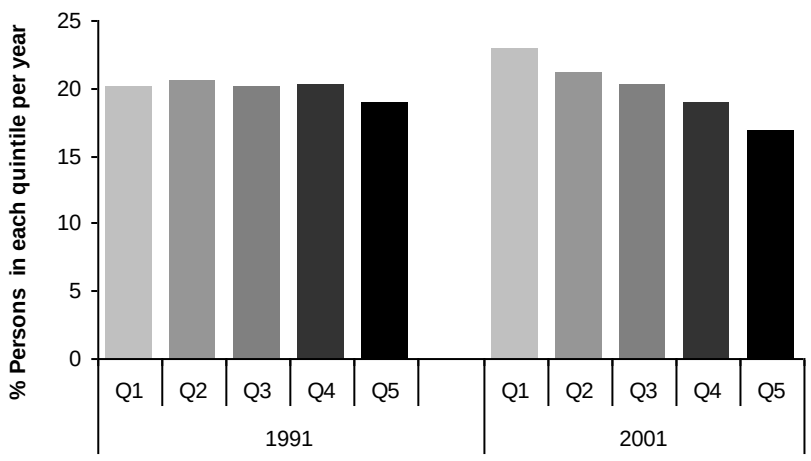


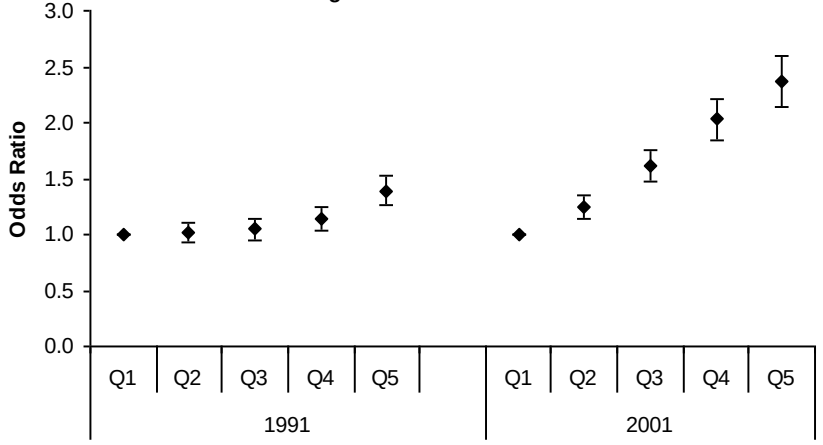
(c)


Age 20-29 in 1991 & 30-39 in 2001
% Persons in each quintile per year
25
20
15
10
5
0
Q1
Q2
Q3
Q4
Q5
Q1
Q2
Q3
Q4
Q5
1991
2001

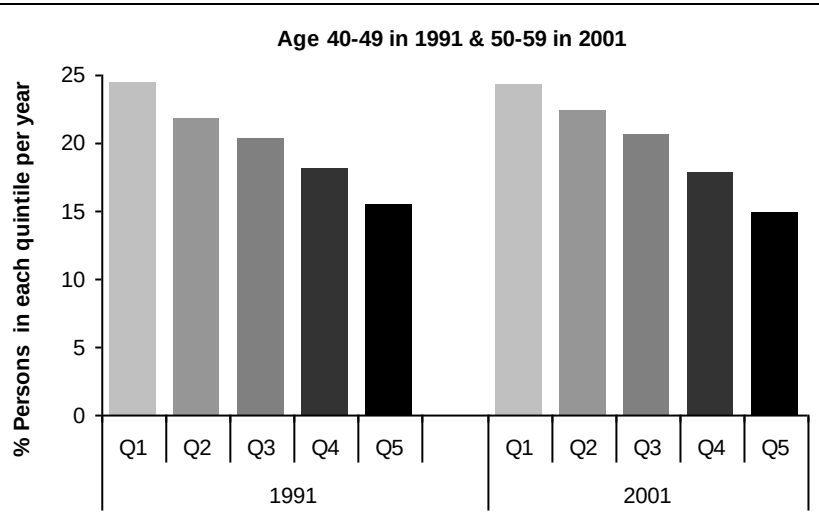

Age 20-29 in 1991 & 30-39 in 2001
Odds Ratio
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Q1
Q2
Q3
Q4
Q5
Q1
Q2
Q3
Q4
Q5
1991
2001

(d)


Age 30-39 in 1991 & 40-49 in 2001
% Persons in each quintile per year
25
20
15
10
5
0
Q1
Q2
Q3
Q4
Q5
Q1
Q2
Q3
Q4
Q5
1991
2001

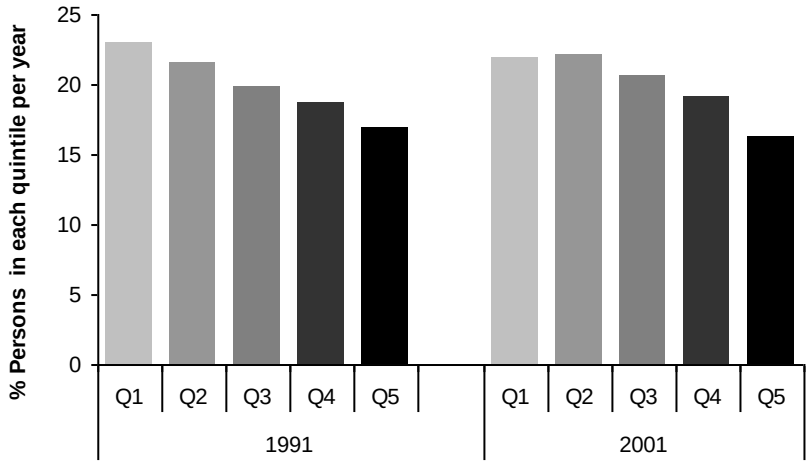

Aged 30-39 in 1991 & 40-49
Odds Ratio
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Q1
Q2
Q3
Q4
Q5
Q1
Q2
Q3
Q4
Q5
1991
2001

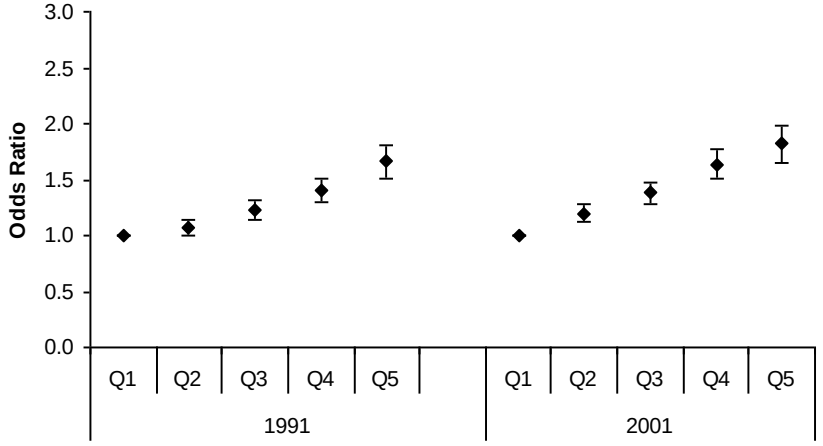
(e)


Age 40-49 in 1991 & 50-59 in 2001
% Persons in each quintile per year
25
20
15
10
5
0
Q1
Q2
Q3
Q4
Q5
1991
2001

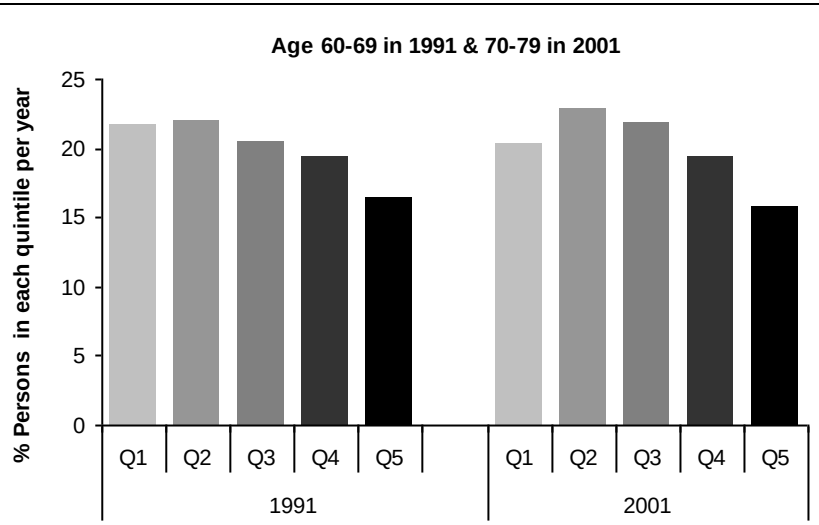

Age 40-49 in 1991 & 50-59 in 2001
Odds Ratio
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Q1
Q2
Q3
Q4
Q5
1991
2001

(f)

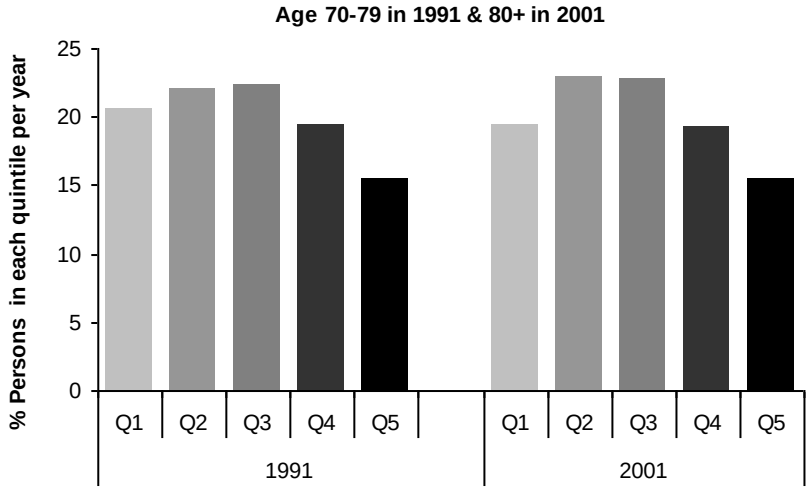

Age 50-59 in 1991 & 60-69 in 2001
% Persons in each quintile per year
25
20
15
10
5
0
Q1
Q2
Q3
Q4
Q5
1991
2001


Age 50-59 in 1991 & 60-69 in 2001
Odds Ratio
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Q1
Q2
Q3
Q4
Q5
1991
2001

(g)

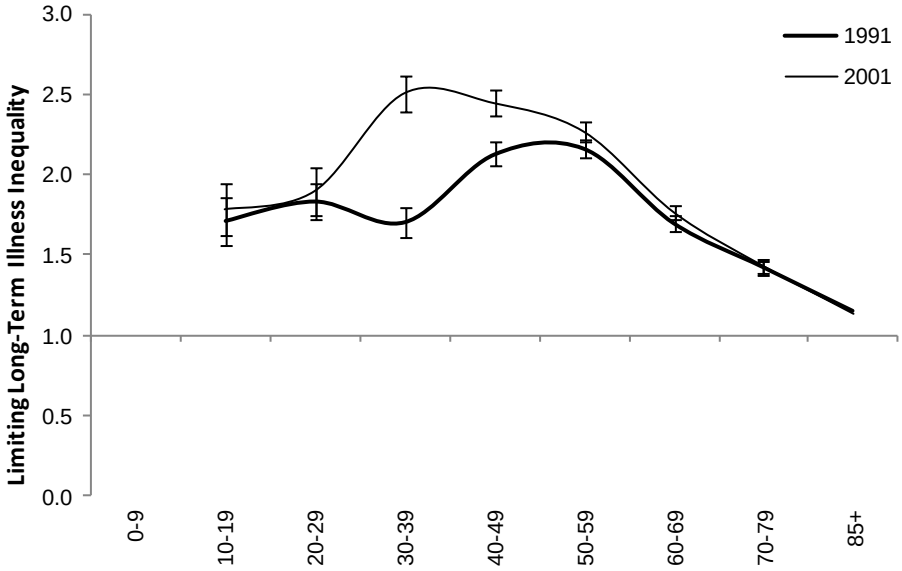


(h)



Note: Authors' calculations based on the ONS Longitudinal Study for England & Wales

Figure 4: Rate ratios (and 95% confidence intervals) of limiting long-term illness in 2001 for England & Wales by five year age groups for persons in the most deprived quintile to least deprived quintile in 1991 and 2001



Note: Authors' calculations based on the ONS Longitudinal Study for England & Wales