The Mortality Risk of Jobseeker's Allowance Claimants: An Analysis using British *National Benefits Data*

Key words: Mortality, death, region, unemployment, Jobseeker, JSA.

Abstract

The aim of this research was to explore the combined effects of social and spatial factors on the mortality risk of British Jobseeker's Allowance[1] (JSA) claimants across time. This involved an analysis of longitudinal *National Benefits Data* held by the Department of Work & Pensions[2] since 1999, which is not publicly available, and the quality of which was previously unknown. The likelihood of dying during the eight-year research period to 2007 was modelled for over seven million JSA claimants in Britain using logistic regression. A model including a range of individual characteristics and data about claim patterns was fitted to each British region/country in order to estimate the probability of dying during the study period for different claimants. Marked geographical variation was found in the risk of mortality as well as significant associations with individual factors such as age, gender, being partnered and having a child. There was interaction between the number of spells on JSA, the length of claim, and how spread these spells were over time.

In order to attempt to control for premature death due to *illness*, individuals who had claimed Incapacity Benefit[3] at any point during this period were excluded from the analysis.

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Note: The views expressed here are those of the author, not those of the DWP.

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Introduction

> 'Research has repeatedly shown a higher prevalence of ill--health and excess mortality in men and women who are unemployed.' p.79 (Bartley et al., 2006)

In the current context of international recession and weekly announcements of significant job losses in Britain, the association between unemployment, ill health and mortality is a growing concern. The unemployed have been found to have poorer self--rated health and higher death rates (above quote) and deterioration in mental health is also common (Bartley et al., 2006; Smith, 1987).

From spatial perspective, significant geographical variation in patterns of illness and mortality across the country have also been highlighted by health geographers (Dorling, 1997; Shelton et al., 2006). In this paper these two strands of research are brought together through an examination of both spatial and social variation in the death rates of those who are unemployed and claiming JSA across Britain.

It should perhaps be noted at this point that the number of people who claim unemployment benefit (JSA) in Britain, known as the "claimant count", does *not* equate to a count of *all unemployed people* according to the International Labour Organisation definition. When compared to Labour Force Survey statistics, claimant count was shown to have *underestimated* the number of unemployed by half a million in 2004 (Machin, 2004). Neither does the claimant count represent a true count of all those people who are "workless", who have left the labour market permanently (or never entered it) to subsist on other, longer term benefits (Beatty et al., 2002).

The aim of this research was to explore the combined effects of demographic, socioeconomic and spatial factors on the mortality risk of British Jobseeker's Allowance[4] (JSA) claimants across time during the 8 year period from 1999-2007. The paper begins with a brief outline of the *National Benefits Data* collated by the DWP and a description of the quality of data. The methodology is described, including the creation of several variables related to benefit spells over time. The results are presented using hypothetical scenarios in order to aid interpretation, and key theories of health inequalities which may explain the findings are presented in the discussion. Some of the difficulties encountered in working with government administrative datasets briefly discussed including limitations upon methodology and available variables.

The British Context

> 'Unemployment carries a risk of premature mortality.' p.156 (Bethune, 1997)

The proportion of "workless" people in Britain has increased dramatically over the last few decades. The post-war boom of the '50s and '60s was followed by rapid economic downturn in the mid-late1970s which presaged the industrial restructuring of the economy involving the loss of hundreds of thousands of (mostly male, full-time) jobs in manufacturing and heavy industry. It has been argued that following mass

unemployment during the deep recessions of the early '80s and '90s, the true rate of worklessness never returned to its previously low-level (Beatty et al., 2002; Walker and Walker, 1997).

The transformation of the economy and labour markets has led to an uneven distribution of work both socially and spatially, with a roughly North/South divide (Webster, 2000, 2006). Also, as increasing numbers of women have entered the labour market, families have become polarised into "dual-work" and "no-work" households (Berthoud, 2007; Gregg and Wadsworth, 1996; Gregg and Wadsworth, 2003; Gregg and Wadsworth, 2004). The emphasis in British welfare policy has historically been on discouraging dependence on the state rather than on equality of income across society. This "minimum subsistence" approach to social security benefits has led to poverty and social exclusion and for many claimants (Philo, 1995).

The Data

Interest has been growing in the use of administrative data for the purposes of social research in recent years (ESRC, 2008; Jones and Elias, 2006; Levitas et al., 2007; Wallgren and Wallgren, 2007), partly for reasons of economic efficiency (Bruhn, 2001), and partly because of the untapped potential of vast data resources held by various government departments (Smith et al., 2004). A major advantage is that these datasets contain information on *whole* national populations or sub-populations (such as *all benefits claimants* in this case), therefore in theory, problems affecting statistical reliability such as sample size, sampling error and bias are no longer an issue. However, there are also drawbacks to working with administrative data, some of which are described below.

The 100% National Benefit Database

The 100% National Benefit Database, (NBD), so-called because it comprises *all* of the benefit records across Britain, is one of the datasets that make up the Work & Pensions Longitudinal Study (WPLS). This is the collective name for a group of datasets held by the Department for Work & Pensions (DWP) which contain longitudinal, "spell-based" information going back to May 1999. The NBD contains claimant records based on administrative data which is collected in job centres and from benefit forms. The data include all types of welfare benefit for working age claimants including Incapacity Benefit[3] and Disability Living Allowance. It was primarily the 100% National Benefits dataset from May 2007 which was used as the basis for analysis, with additional socio-demographic data on claimants merged in from another WPLS table.

Data protection is an important issue due to the sensitive nature of the data[5]. Therefore access was only granted to the *encrypted* version of the dataset, and all analysis was carried out on-site at the DWP in line with the required protocols.

Data Quality

Such administrative datasets are not the result of research, but a by-product of managing millions of welfare state cash transfers. Thus although DWP staff constantly strive to improve the quality of data in the WPLS, the accuracy of some data remains questionable. For example, it seems highly unlikely that almost 80% of JSA claimants, who are working age adults, did not have any children at the start or end of the claim, particularly as over 36% of them are cohabiting/married or separated/widow/divorced.

It may be that the question requires clarification – children may be perceived as dependent (young) rather than grown-up, and a parent may not be living full-time with

their children. It is also possible be that single, childless people are more likely to be unemployed/claim JSA. However, there may also be a disincentive to admit parenthood in some cases. For example, some male JSA claimants may not wish to jeopardise an ex-partner's Income Support[6] claim ought to be responsible for child maintenance payments. It has been suggested that the rise in male worklessness in Britain has contributed to a higher rate of *relationship breakdown* thereby increasing the number of lone parent families (Rowthorn and Webster, 2008).

Due to these uncertainties about the quality of data recorded some variables could not be a used.

Missing Data

The level of missing data varied considerably between variables. Although age, gender and geography were of good quality, other socio-economic indicators were far less reliable.

Table 1. Missing Data from May 2007 Jobseekers Dataset by Variable

Variable	*% Data Missing*
Postcodes/ Geography	2.75%
Lone Parent indicator	1.4%
Marital Status	8.1%
Ethnicity	**17.6%**
"Usual" occupation	**13.7%**
No. of Children at Start of Claim	**14.9%**

For example, for Lone Parent status, the *default* is "Not a lone parent", therefore there is no way of telling whether this data has been entered or not (although this indicator is felt by DWP staff to be reliable (Marshall and Joyce, 2007)).

Some Basic Descriptive Statistics

The final datasets comprised 7,037,496 individual JSA claimants of working age (16 -59 for women and 16-64 for men). The gender split was 34.8% female claimants to 65.2% males (roughly 1 woman **:** 2 men). There were a total of 64,677 deaths across the eight years worth of data from June 1999 to May 2007. Of those who died 10,050 were women and 54,627 were men. Thus although men constituted approximately two thirds of this dataset, over 5/6 of JSA claimants who died were male. This means approximately 2.5 times more male JSA claimants died than females. 3.7% of all claimants were recorded as being lone parents (see above).

Method

Although multilevel modelling was the preferred option due to the geographical clustering in the data (see *Discussion* below), restrictions on downloading specialist software meant that this was not feasible. In practice logistic regression was found to be the only method *available* on-site at the DWP at the time of analysis which was capable of handling the 7 million plus cases with a wide range of explanatory variables. Therefore a model was developed using SAS PROC Logistic and applied separately to JSA claimants in each British region/country.

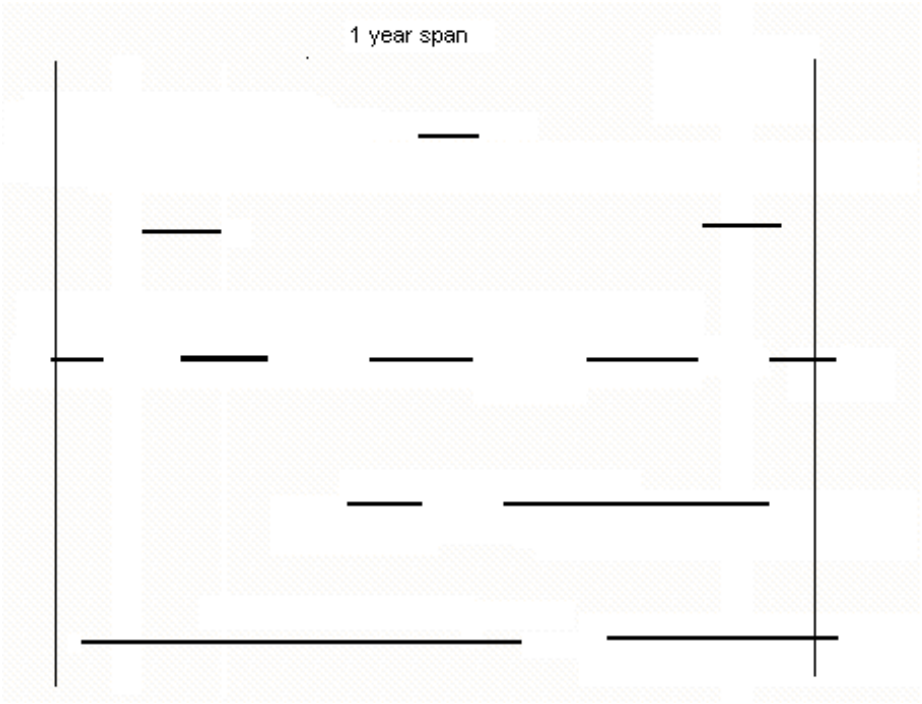
Dealing with Missing Data

As the quality and accuracy of many variables was previously untested and appeared to be unreliable in some cases, imputation was judged to be inappropriate. Doubt has also been thrown on the value of imputing certain individual characteristics such as ethnicity (Platt et al., 2005). Therefore in order to prevent the exclusion of a large proportion of claimants from the analysis, separate “missing” categories were created for the ethnicity, standard occupational classification group, marital status and lone parent variables. In this way the coefficient produced for the “missing" group could be compared to those of the other categories within a variable to check for bias.

The Research Period

The start date of the study period is 1st June 1999. So although claimants may have benefit spells which ended *prior* to this date, they are not recorded in the NBD and are therefore unknown. Including the original start date of *continuous* claims which started prior to this date known would have biased the survey towards these longer claims.

Figure 1. Different benefit claiming patterns



Time-related Variables

As the dataset was far too large to conduct a multilevel discrete-time event history analysis, several variables were constructed to represent the number of benefit spells, breadth of time spanned by claiming “career” and proportion of time spent claiming. Similar methods have been used by other researchers comparing benefit claimants (Crawford et al., 2008).

A dummy variable was also constructed to represent the year of entry into the study period (Allison, 1984) as the mortality risk for individuals who claimed at earlier dates is cumulative with each year of "observation" as they age.

"Yearin"	Year of entry into study period: June 1999 – May 2000.
Number of Spells	A simple count of the number of separate spells on JSA.
Claim *Spread*	Count in days from the first day of the first claim to the last day of the last claim.
Total days	A count of the total number of days spent *on benefit* (all episodes)
Claimratio	The *proportion* of the time-span spent on JSA = Totaldays / Claim *Spread*

Testing for Variable Significance

Variables entered into the model were tested using the difference between the "model chi-squared"[7] statistic G_M (Menard, 2002). All variables in the final model were found to be significant in at least one of the regions.

Assessment of Model Fit (R^2)

There are many different versions of an equivalent statistic in logistic regression to the R^2 used in linear regression using Ordinary Least Squares (Allison, 1999; Menard, 2002). This statistic estimates the proportion of variance explained by the model thereby giving some indication of model "fit". The statistic used here is R_L^2 as recommended by Menard (Menard, 2002).

Results

There is an ongoing debate in statistical circles about whether standardising coefficients could lead to the misinterpretation of results. Therefore in order to illustrate the results in an intuitive and accessible way, the variation in claimants' mortality risk is described using hypothetical scenarios. The probabilities in results tables were estimated using the raw, unstandardised coefficients produced by the model[8].

Geography

> ' The general geographical pattern of average life expectancy is well known, being shorter in the north of Britain and in the inner areas of cities.' p.4 (Dorling, 1997)

If we take the hypothetical example of a 44-year-old white single, childless male in the "unskilled" occupational group, who made one JSA claim of eight weeks duration during the study period in 2001-2, the variation in mortality risk[9] by geographical region was found to be as follows:

Table 2. *Variation in Mortality Risk BY Region*

(above scenario)

BEST		**WORST**	
South-West	**1.5%**	**Scotland**	**2%**
South-East	1.6%	West Midlands	1.9%
Other Regions	1.6%	London	1.8%
Wales	1.6%	North-East	1.7%

It is immediately apparent that the regions with the worst mortality are those which have had the highest poverty rates for many decades (London and Scotland) and two former hubs of heavy industry and manufacturing (North-east and West Midlands) which were hit hard by the restructuring of the British economy in the late 20th century. Also noticeable, is that the two wealthiest regions in the South of England have the lowest mortality rates (for this scenario).

Age

If the claimant in the same scenario was older, say 55, his chance of dying during the following five years of the study period more than doubles (see Table 3), which is in line with figures produced in government life tables[10]. There is evidence of a slight re- -ordering of the worst regions, with claimants being more likely to die in London than in Scotland. However, this *could* be due to early deaths ***prior*** *to the age of 55* in Scotland.

Table 3. *Variation in Mortality Risk BY Region – Age increased to 55*

(above scenario)

BEST		**WORST**	
South-West	**3.6%**	**London**	**4.7%**
Wales, East Mids & East of England	3.8%	West Midlands	4.6%
South-East, Yorks & Humber	3.9%	Scotland	4.4%
North-West	4%	North-East	4.3%

If the claimant was younger, say aged 23, they would have had a 0.5% probability of dying (one in two hundred) - slightly lower in the South-west, and slightly higher in the West Midlands (0.6%) and Scotland (0.7%).

Gender, Partnership & Parenthood

If our hypothetical JSA claimant was *female* rather than male, and 44 years old, she would have *less than half the likelihood of dying* compared to an equivalent male. Male claimants in this database were on average 2.5 times more likely than women. Recent research has shown that such ratios have become the *norm* among affluent countries for those in the 20-50 age group (Rigby and Dorling, 2007).

Table 4. Mortality Risk for Women Claimants by Region, Partnership & Parenthood

	Single, Childless *Man*	Single, Childless *Woman*	Married/ Cohabiting *Woman*	Single Mother
West Midlands	1.9%	**0.9%**	0.4%	0.4%
London	1.8%	**0.8%**	0.4%	**0.5%**
North-West	1.6%	0.7%	0.4%	0.4%
East of England	1.6%	0.7%	0.4%	0.4%
Scotland	2.0%	0.7%	0.3%	0.4%
Yorks & Humber	1.6%	0.7%	0.3%	0.4%
North-East	1.7%	0.7%	0.3%	0.3%
Wales	1.6%	0.7%	0.3%	0.4%
East Midlands	1.6%	0.7%	0.3%	0.3%
South-East	1.6%	0.7%	0.2%	0.3%
South-West	1.5%	0.7%	0.2%	0.3%

> 'Married women are known to be in better health and to have lower mortality than those who remain single or become widowed, divorced or separated.' p.166
> (Bethune, 1997)

However, as Table 4 above shows, *single childless female* claimants had a significantly *higher mortality risk* than partnered women and single mothers. Partnered/ married women had the *lowest* mortality risk, and having children was generally found to have a protective effect.

Living with a Partner

Being separated, widowed or divorced (all one category) increased the risk of dying compared to both single people and those who lived with a partner, in the North and East of England and in Scotland. However, when the interaction between

partnership and gender was taken into account, it was found that partnership loss had a more detrimental effect for *female* claimants (above quote). In fact separated/ widowed or divorced males, had a slightly better risk of mortality than *single* women on JSA, but only in the three northern regions and Scotland.

Partnered Parents with Children

An experimental regression including the "Number of children at start of the claim" variable (see above), was undertaken for Scotland. However, the results showed that in the case of partnered parents, the most significant reduction in the claimant's risk of mortality came from *living in a partnership*, which virtually halved the risk (from 2% to 1.1%). Having children further reduced the chances of dying by 0.1% for the first child, then approximately 0.05% for each child thereafter. However, as explained above, the quality of this variable is uncertain, although the direction of its effect seems logical. Being a *lone* parent on JSA was associated with a similar "healthy effect" to being in a couple in terms of estimated mortality, more than halving the risk of dying in several regions (for both men and women).

A further point worth noting is that there may be a difference between those lone parents who claim JSA, and are seeking work and those who claim Income Support (the British equivalent of "welfare"). It is possible for example that those claiming Income Support have never worked, are less skilled, have younger children and have less access to childcare or family support. Berthoud found that lone parents who lacked skills were particularly disadvantaged in the employment market (Berthoud, 2003), as well as those with young children. Therefore single parents who claim JSA may not be representative of all lone parents.

Table 5. *Mortality Rates of **Male** JSA Claimants by Region BY Partnership Status*

British Region/Country	Single, Childless Male	Married/ Cohabiting
Scotland	**2%**	**1.6%**
West Midlands	**1.9%**	**1.5%**
London	**1.8%**	**1.5%**
North-East	1.7%	1.6%
South-East	1.6%	1.6%
East Mids, NW & East	1.6%	1.5%
Yorks & Humber	1.6%	1.4%
Wales	1.6%	1.4%
South-west	**1.5%**	1.5%

Occupational Group

> 'An area's age/gender structure is becoming *less* important, while the socioeconomic status of its population becomes *more* important in explaining the deaths which occur there over time.' p. 46 (Mitchell et al., 2000)

Table 6 below compared to mortality risk for the highest and lowest professional groups recorded in the data. Mortality differences by social class and "the challenge of the social gradient" are well-documented (Black et al., 1982; Marmot et al., 1991; Marmot and Wilkinson, 2006) though still uncomfortable to read. Unskilled workers in Wales of the same gender, age and partnership status were *twice* as likely to die when compared to professionals in occupational group 2. This ratio was also high for London and Scotland and interestingly, the South-West region.

Table 6. *Male JSA Claimants by Region & Low/High Occupational Groups*

Region	**Unskilled Occ Grp 9**	**Prof'nls Occ Group 2**	**Ratio of Unskilled to Professional Death-rates**
Wales	**1.6%**	**0.8%**	**2.0**
London	**1.8%**	**1.0%**	**1.8**
Scotland	**2.0%**	**1.2%**	**1.7**
South-west	**1.5%**	**0.9%**	**1.7**
West Midlands	**1.9%**	1.2%	1.6
South-east	1.6%	1.0%	1.6
East Midlands	1.6%	1.1%	1.5
North-west	1.6%	1.1%	1.5
North-East	1.7%	1.2%	1.4
East England	1.6%	1.2%	1.3
Yorks & Humber	1.6%	1.2%	1.3

If, instead of being "unskilled", our hypothetical 44-year-old single male claimant belonged to a *skilled* trade, his estimated risk of dying during the research period decreased only slightly (except in the north-east of England where it actually *increased* slightly).

However, whereas age, gender and marital status are fairly simple and direct questions, the occupational groupings above come from the "usual" and "sought" occupations listed on JSA claim forms by the claimant. These may be difficult to read and code and may not always be accurate. Recent research (Marshall and Joyce, 2007) has shown considerable variation in the training and knowledge of front-line staff in job centres, with some geographical areas having far higher levels of staff turnover

(eg London) than others. Therefore the quality of this data is both untested and unknown.

Ethnic Group

As the number of deaths of people from non-white ethnic groups claiming JSA is relatively small, (see TABLE 7 below) especially when divided into regions and analysed by age, gender, marital status, occupation and so on, it was necessary to summarise ethnicity by broad groups. Specific ethnicity categories only became significant if there were enough claimants from ethnic minority groups living in a particular region. So, for example, hardly any ethnic categories were significant in the North-East or Wales where *relatively* few non-white people live, whereas all of the ethnic groups listed (apart from Caribbean Black) became significant in London.

Table 7. Number of Claimants by Gender & Ethnic Group
(excluding those where ethnicity was "missing")

	Female		Male	
	%	Count	%	Count
White	25.2	1,771,976	48.2	3,394,073
Pakistani/Bangladeshi	0.67	47,333	1.1	106,010
Indian	0.7	50,018	1.0	69,073
Chinese	0.09	6,307	0.14	9,706
Caribbean Black	0.21	14,808	0.4	29,583
African Black	0.46	32,595	0.9	64,108
Mixed Race	0.26	18,167	0.46	32,638
Other	0.63	44,594	1.55	108,890

The main finding was that all people belonging to non-white ethnic groups have a lower risk of dying than white people. *However*, a team of researchers at the Institute of Fiscal Studies have suggested that multiple regression techniques may prove inadequate, 'if … there is not complete overlap in the *range* of values for the control variables (the so-called common support problem)' p.14 (Crawford et al., 2008). As many non-white ethnic groups have a different, younger age profile than white British people , this may well have affected the model's ability to "hold age constant" while comparing characteristics such as ethnic group.

Ethnicity "Missing" Category

Over 17% of the JSA claimant population across the country had no ethnicity recorded. The "ethnicity missing" category was significantly associated with a *lower* mortality risk than any other ethnic group in every single region. However, entering an interaction term "*ethnicity* and *age*" into the model produced a *higher* estimated mortality risk for older people with "missing ethnicity" than for every other ethnic group.

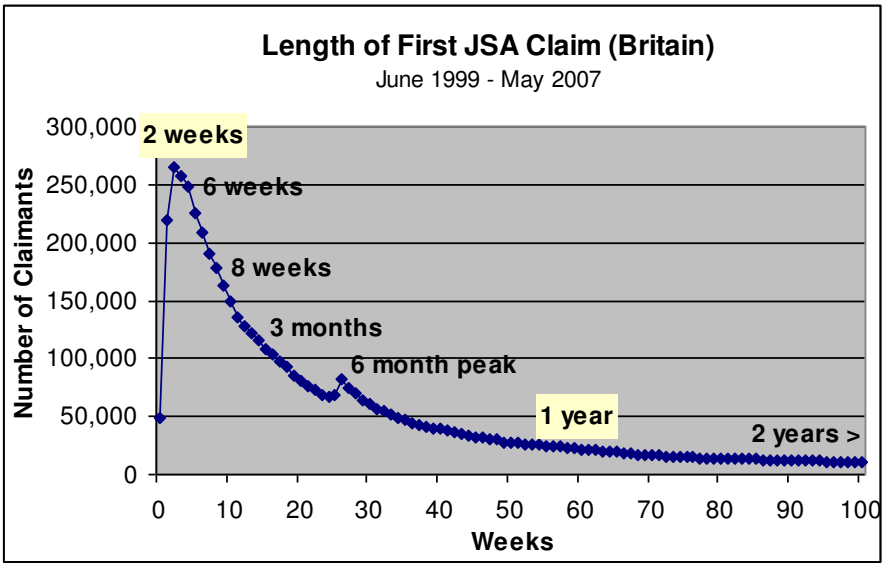
This may indicate the presence of different subgroups (*unobserved heterogeneity*) within this category. For example, in previous years, when ethnicity was not collected as a matter of course, it may have been white British people whose ethnicity was data was missed, however, more recently, it may be non-white ethnic groups who have declined to provide this information.

Number of Spells on Benefit over Time

By far the majority of cases, from 88% - 93% across the various regions, consisted of a single episode of claiming JSA during the study period. People who claimed one or two spells on JSA made up 99.9% of cases in nearly all regions in this database (99.8% in Wales). Therefore only a very small proportion of claimants experienced truly "multiple" claims during the study period.

FIGURE 2 below shows that the majority of first claims are only a few weeks long, with claimants signing off fairly rapidly in the first 10 weeks. The gradient of "off-flow" is slightly shallower between 11 weeks and 6 months, at which point there is another peak (possibly due to a scheduled "workforce interview" or other milestone in the welfare to work process).

Figure 2. Length of First JSA Claim (during study period)



The pattern for 2nd claims is fairly similar, peaking at 2-3 weeks, but with a less--steep off-flow.

Each additional episode on JSA were found to be associated with an *increase* in the risk of dying, however, this depended on how *spread* the claims were over time. If we return, to our 44-year-old white, (single, childless, unskilled) male claimant and hypothesize that he has now made two claims during a *short* period of time, (a total of 8 weeks on benefit in three months). In this case his risk of dying would increase by half as much again from 1.9% to 2.7% in the West Midlands (and from 1.5% to 1.9% in the South-West).

This is perhaps understandable, as the turbulence resulting from changing states between employment and unemployment twice within a very short space of time would be incredibly stressful and unsettling for most people. Not only would financial insecurity impinge potentially on housing and other areas of life, but there would be the additional stress of having to re-apply for unemployment benefit and begin searching for jobs anew. However, if these two spells were spread over a *longer period*, for example, a year, rather than three months, this mitigated the effects significantly, resulting in a only a slight rise of 0.1 – 0.2% in the probability of dying.

If claims are *even more spread*, for example over two years or more, the claimant is actually *less likely to die* than someone who only has one episode on JSA.

However, this may be due to the effect of *selection over time*, whereby those people whose claims are spread over a longer period of time are actually the *survivors* (- the claimants who are left when everyone who is going to die has died). Therefore the interaction of more spells on benefit with length of time may be biased toward longer--lived claimants (who, in the parlance of survival analysis, comprise a different "risk set"[11] (Allison, 1984)).

Length of time spent on JSA ("Total Days on Benefit" variable)

The risk of death for our hypothetical claimant increased very slightly with the length of a single spell on JSA (a *range* of 1.4% - 1.9% across regions if the claim was only one week long, increased by 0.2% to 1.6% - 2.1%, if they claimed for six months). The highest estimated mortality rate was in Scotland, followed by the West Midlands, and then London. Again there was an interaction with time and the length of spells if longer claims were *spread over a longer period,* but the potential selection effect described above between the number of spells and time applies in this case as well.

Discussion

> '… the death rates of the most deprived individuals had not declined in the 1990s, whereas those of the least deprived individuals had declined substantially.' p.341
>
> (Uren et al., 2001)

The significant variation in mortality rates by geography, socioeconomic position inevitably raises questions of social justice in British society. But through what mechanisms might these differences translate themselves into premature death? Bartley (Bartley 2004) outlined some of the main theoretical approaches which have been used to explain health inequalities:

- Behavioural/Cultural
- "Psycho-social"
- Lifecourse Approach
- "Neo-materialist"
- Identity crisis

Cultural & Behavioural Norms

> '[Scotland] drank nearly 50 million litres of pure alcohol in 2007 - equivalent to 11.8 litres per capita for every person aged over 16. This is considerably higher than England and Wales…' (The Scottish Government, 2009)

This approach is based on the different cultural norms of various sections of society or geographical areas. For example, the propensity of people belonging to the lowest socio-economic groups to smoke, drink heavily, and, through eating foods which are considered unhealthy (high in saturated fats, salt, sugar and additives etc), to be more obese. Culture might be proffered as an explanation for Scotland's high alcohol consumption (above quote).

Psycho-social Pathways

> '… circumstances also affect health indirectly through their influence on our subjective experience of life.' p.2 (Wilkinson, 2000)

Elstad (Elstad, 1998) has argued that psychosocial stress can have both direct and indirect effects on health. For example, financial problems may cause anxiety which affects health directly by interfering with sleep patterns and impairing a person's ability to cope with daily life. Stress has been shown to affect blood pressure, hormone secretion (raised levels of cortisol) and the immune system (p.41). Other kinds of stress such as feeling socially insecure or inferior may lead people to indulge in unhealthy behaviours such as binge-drinking, taking drugs or comfort-eating, which may eventually lead (*indirectly*) to poorer health. In turn these unhealthy behaviours such as alcohol or drug abuse may be the common factor that leads to a) unemployment and b) remaining single or relationship dissolution for some individuals, putting them at high risk of mortality (Table 5 above). Elstad suggests that long-term, *chronic* stressors (such as persistent low income or living in poor quality housing/a deprived area) are, '… unevenly distributed in society,.. in line with structural inequalities.' p.45 (Elstad, 1998).

One of the key proponents of the psychosocial pathways approach is Richard Wilkinson (Wilkinson, 1996; Wilkinson, 2000; Wilkinson, 2005). Wilkinson suggested that low social status leads to an increase in stress hormones and levels of socially created anxiety which constitute a health risk, particularly if stressful conditions persist. However, this has often involved the comparison of different life expectancies and average health *between countries*, rather than health inequalities *within societies*, which has led some to argue that this is the theory of "social ecology" rather than health inequalities (Bartley 2004). But Wilkinson also cites the work of researchers such as Marmot on the fine-grained distribution of health inequalities across the hierarchical grading system of British civil servants (Marmot et al., 1991; Marmot et al., 1978), which provides compelling evidence of the *granularity* of our social hierarchy.

This theoretical standpoint not only provides a possible explanation for the "social gradient" of mortality risk across occupational groups in the above results, but also for the seemingly high level of variation *within* the lowest occupational group across regions. If people who work and own their houses plus two cars are healthier than people who work in a similar job and own their houses plus *one* car (Marmot and Wilkinson, 2006) then the *broad* classification of 10 occupational groupings is unlikely to capture the complexity of a person's position in the social hierarchy (Nazroo and Williams, 2006). As this alone gives no indication of their standard of living, working conditions, job security, housing quality and so on.

The Neo-materialist Explanation

> 'The risk for premature mortality tends to increase as income level declines. In the UK, for example, it has been estimated that a quarter of all premature deaths can be linked to poor socioeconomic circumstances resulting primarily from receiving low incomes ' p. 294 (Sabel et al., 2007)

In the 21st century we tend to assume that everyone in relatively wealthy developed country like Britain has enough to eat and drink, will not be left destitute or

homeless, and has access to free health-care. The "*neo*" aspect of this explanation hinges more on the fact that although those on lower incomes may have less access to adequate housing and food they also lack good quality education and health services. For example, whereas it is fairly common now for well-off families to move house into an area where there is a good state school (or to finance private schooling) in order to invest in their children's education, low income families do not have this choice.

Although we *could* assume that anybody obliged to claim Jobseeker's Allowance is in a position of reduced income, we have no real information from this dataset about their long-term wealth or income from employment (or partner's employment), their housing situation or access to transport, good health or education services.

The Lifecourse Approach

> 'Life chances are structured so that they tend to cluster cross-sectionally and accumulate longitudinally.' p.55
> (Blane, 2006)

The core of this approach to health inequalities is the accumulation of what might be termed "health capital" which can build up or become depleted over time (Wadsworth, 1996). This begins with the health of the mother prior to and during pregnancy (Barker, 1991), and extends across the lifecourse from birth through childhood and teenage years into different stages of adulthood. As the above quote indicates, not only does socioeconomic disadvantage tend to "cluster" at single time-points so that people are rarely disadvantaged in only one sphere of life, it also "clusters" across lifetime.

Unlike the Scandinavian countries, where it is possible to link socioeconomic and health data from administrative records across the lifecourse, it is not feasible to do this with British administrative data at the current time Although this may be a possibility for the future.

Identity Crisis

> ' We define ourselves through employment.'
> p.1 (Smith, 1987)

Bartley's preferred explanation (Bartley 2004) hinges on the breakdown of more traditional roles (for example the male/husband breadwinner role), which she argues has led to personal identity becoming increasingly negotiable. As the population has become more mobile in the search for work and a better life, society has also become more fluid and networks have become less rooted in local areas and geographical communities. It is suggested that such pressures have led individuals to signal their identity more through 'outward symbolic display' (p.18), rather than relying on an inner sense of worth. The process of being able to *remake* oneself poses new possibilities, but may also requires increased investment in terms of money and acquisitions (what neighbourhood to live in, what car to drive, clothes/"labels" to wear).

> "Women get sicker, but men die quicker" (p.13)
> (Lorber and Moore, 2002)

This emphasis on personal identity may shed some light on the higher risk of premature death for *men* in Britain, as social changes since the 1970s, such as the changing role of women (in work, the family, education) may have affected the way in which *men* achieve their sense of status and self-esteem in society through constructs such as “masculinity”. As former cornerstones of identity, particularly for working-class males such as “the breadwinner” and strong “manual worker” become less available and less valued by society. Men lower down the social hierarchy seem to be losing on several fronts. However, such psycho-social factors may interact with biological ones as it has been shown that newborn baby girls are physically stronger than their male counterparts and that oestrogen is a protective hormone (Lorber and Moore, 2002).

Stressful "Life Events” & Health

> ‘… the stress I've had in the last week has probably knocked a few months of my life.’ Rob Hayles, *British Track Cyclist* being tested for doping (Moore, 2008)

It is now common knowledge that certain life events that involve loss or sudden change, can be incredibly stressful. These may include: family death, job loss, relationship breakdown, debt, moving house, illness, changing jobs. Such life “shocks” can manifest themselves in very physiological ways by making people ill (Brown and Harris, 1978), or may make them more vulnerable to illness/infection. Holmes and Rahe (Holmes and Rahe, 1967) developed a scale for measuring the potential impact of stressful life events on mental health, among which losing a job and a change in financial circumstances ranked quite high. Therefore the actual process of *becoming* unemployed comprises an *adverse* life event.

> ‘…persons who have poor health are being selected for the pool of the unemployed.’ p.161
> (Bokkerman and Ilmakkuna, 2009)

Some studies, however, have found that those who become unemployed were already less healthy than those in the working population (Bokkerman and Ilmakkuna, 2009). It is possible for example that those who experience more than one episode of unemployment / JSA claiming close together have a reduced capacity to maintain a job for some reason but have not yet claimed Incapacity Benefit. Some attempt was made to try and control for cases where episodes of unemployment and claiming JSA may have been due to a developing illness by excluding those who claimed Incapacity Benefit (for long-term illness) at any point. However, this may not have eliminated those with unacknowledged health problems which affect their capacity to maintain steady employment (eg alcohol, drug or mental health problems) or whose vulnerability due to insecure employment eventually affects their health.

Methodological Issues

> '... individuals in the same area tend to have similar characteristics: a phenomenon known as within-area homogeneity.’ p.817 (Tranmer and Steel, 1998)

As mentioned above, the geographical variation demonstrated above suggests that it would have been useful to have applied a multilevel model if the required analytical

software had been available which could have handled such large numbers. Although some authors have included geographical level variables alongside individual characteristics in a logistic regression (Berthoud, 2003), this is not generally recommended, as one of the fundamental rules of logistic regression is that the observations (or individuals) are independent of each other, and people who live in the same area tend to be more alike (above quote).

A multilevel model would have enabled the addition of area-level variables such as of unemployment rate, average poverty rate or indicators of multiple deprivation into the model (applying spatially aggregated variables at the individual level is inappropriate[12] (Tranmer and Steel, 1998)). Furthermore, discrete-time event history analysis could have been undertaken using this type of methodology.

Unfortunately, the choice of model in this case was limited by the strictures and analytical software available for analysis on-site at DWP offices. Although SAS 9 was available, the GLIMMIX macro for multilevel analysis was not, nor was it possible to download specialist software such as HLM or MLwiN onto DWP computers. SAS PROC NLMIXED (for non-linear mixed models) could not handle more than two or three basic variables at a time even with a vastly reduced dataset. Analyzing a copy of the data on another computer on-site or off-site was prohibited due to data protection.

Limitations to the Data

> '...those living in owner-occupied accommodation experience lower mortality rates than those living in rented accommodation and those living in households with access to cars has considerably lower mortality than those without access.' p. 341 (Uren et al., 2001)

Every dataset has its advantages and disadvantages. However, the lack of core sociodemographic variables such as educational qualifications, car ownership and housing tenure (owner occupied/private rented/social housing) in *National Benefits Data* is very limiting. Not having access to a car and living in social housing have been found to be important indicators of multiple deprivation and higher rates of mortality (Uren et al., 2001; Voas and Williamson, 2001).

It would also be extremely useful to have some additional information about the employment status of a claimant's partner and other household members as they have been shown to have an important influence on each other (Davies et al., 1992) and excluding an important cluster variable can distort model results (Tranmer and Steel, 2001).

Improving the quality of data on family status regarding parenthood and the number of children should also be a key concern, although there may be disincentives for some claimant to provide this information. It is hoped that through increased data-sharing of information relating to child and housing benefit, at least some of these data may become available in the not too distant future.

Conclusion

These results have confirmed some of the trends in mortality identified by other researchers across the whole population: a much higher death rate for males, the potentially protective effect of living with a partner/having children and the hierarchy of risk linked to occupational group. There is some evidence that multiple episodes of

unemployment and claiming JSA *close together* are associated with an increased risk in mortality. However, a significant amount of variation in the risk of dying for JSA claimants by geographical region remains unexplained by the data. The main conclusion therefore is that further detail is needed about an individual's socioeconomic history and health across the lifecourse in order to explore the finer "granularity" of their current position in the societal hierarchy.

In terms of the data the fundamental problem with the WPLS is that the *extent* of *error* in national benefits data remains unknown and the degree of *bias* in most missing data has not been adequately investigated. Furthermore, only a limited range of socioeconomic variables are available due to its administrative origins.

References

Allison P, 1984 *Event History Analysis: Regression for Longitudinal Event Data* (Sage, Newbury Park, California & London & New Delhi)

Allison P, 1999 *Logistic regression using the SAS system : Theory and Application* (SAS publishing)

Barker D, 1991, "The foetal and infant origins of inequalities in health in Britain" *Journal of Public Health Medicine* **13** 64-68

Bartley M, 2004 *Health Inequality: an introduction to theories, concepts and methods* (Polity Press, Cambridge)

Bartley M, Ferrie J, Montgomery S, 2006, "Health and labour market disadvantage: unemployment, non-employment and job insecurity", in *Social Determinants of Health* Eds M Marmot, R G Wilkinson (Oxford University Press (OUP), Oxford) pp 78-96

Beatty C, Fothergill S, Gore T, Green A, 2002, "The Real Level of Unemployment 2002. Sheffield, ." (CRESR, Sheffield Hallam University, Sheffield)

Berthoud R, 2003, "Multiple disadvantage in employment: a quantitative analysis", in *Work and Opportunity Series* (Institute for Social and Economic Research, University of Essex

Joseph Rowntree Foundation, York) pp 1-45

Berthoud R, 2007 *Work rich and work poor: Three decades of change* (The Policy Press (on behalf of Joseph Rowntree Foundation), York)

Bethune A, 1997, "Unemployment and mortality", in *Health Inequalities: Decennial supplement* Eds F Drever, M Whitehead (Office for National Statistics - The Stationery Office, London) pp 1-257

Black D, Morris J N, Smith C, Townsend P, Davidson N, 1982 *Inequalities in Health: The Black Report* (Penguin Books Ltd, Harmondsworth, (UK), New York, Ringwood (Aus), Markham (Canada), Auckland)

Blane D, 2006, "The Lifecourse, the social gradient, and health", in *Social Determinants of Health* Eds M Marmot, R G Wilkinson (Oxford University Press (OUP), Oxford) p 366

Bokkerman P, Ilmakkuna P, 2009, "Unemployment and Self-assessed Health: evidence from panel data" *Health Economics* **18** 161–179

Brown G, Harris T, 1978 *The Social Origins of Depression: A Study of Psychiatric Disorder in Women* (Tavistock, London)

Bruhn Å, 2001, "Mid-Decade Assessment and Future Prospects: The 2005 population and housing census in Sweden ", in *Symposium on Global Review of 2000 Round of Population and Housing Censuses* (Statistics Division, Department of Economic and Social Affairs, United Nations Secretariat

New York)

Crawford C, Dearden L, Mesnard A, Shaw J, Sianesi B, Urwin P, 2008, "Estimating ethnic parity in Jobcentre Plus programmes: A quantitative analysis using the Work and Pensions Longitudinal Study (WPLS)", in *Department for Work and Pensions Research Report* (Institute for Fiscal Studies on behalf of the Department for Work and Pensions, Norwich) p 303

Davies R, Elias P, Penn R, 1992, "The relationship between a husband's unemployment and his wife's participation in the labour force" *Oxford bulletin of economics and statistics* **54** 145 -171

Dorling D, 1997, "Death in Britain: How local mortality rates have changed: 1950s - 1990s", (Joseph Rowntree Foundation, Bristol) pp 1 - 68

Elstad J I, 1998, "The Psycho-social perspective on social inequalities in health", in *The Sociology of Health Inequalities* Eds M Bartley , D Blane, G Davey-Smith (Blackwell Publishers Ltd, Oxford & Malden, USA)

ESRC, 2008, "Administrative Data Liaison Service And Secure Data Service - Call For Proposals "

Gregg P, Wadsworth J, 1996, "More work in fewer households? " in *New Inequalities: The changing distribution of income and wealth in the United Kingdom* Ed J Hills (Cambridge University Press, Cambridge) pp 181 -207

Gregg P, Wadsworth J, 2003, "Workless households and the recovery", in *The Labour Market Under New Labour: the State of Working Britain* Eds R Dickens, P Greg, J Wadsworth (Palgrave Macmillan, Basingstoke, UK & New York) pp 32-39

Gregg P, Wadsworth J, 2004, "Two Sides to Every Story: Measuring the Polarisation of Work", in *CDP discussion papers* (Centre for Economic Performance, LSE, London)

Holmes T, Rahe R, 1967, "The social readjustment rating scale" *Journal of Psychosomatic Research* **11** 213-217

Jones P, Elias P, 2006, "Administrative data as a research resource: a selected audit", in *The National Data Strategy* (ESRC & Warwick Institute for Employment Research) p 123

Levitas R, Pantazis C, Fahmy E, Gordon D, Lloyd E, Patsios D, 2007, "The Multi-dimensional Nature of Social Exclusion", (Townsend Centre for the International Study of Poverty & Bristol Institute for Public Affairs (University of Bristol),

funded by the Department for Communities and Local Government (DCLG)) p 12

Lorber J, Moore L, 2002 *Gender and the Social Construction of Illness* (AltaMira Press, Walnut Creek, California)

Machin A, 2004, "Comparisons between unemployment and the claimant count" *Labour Market Trends* 59-62

Marmot M, Davey Smith G, Stansfeld S, Patel C, North F, Head J, White I, Bruno E, Feeney A, 1991, "Health inequalities among British civil servants: Whitehall II Study" *The Lancet* **337** 1387-1393

Marmot M, Rose G S, Shipley M, Hamilton P, 1978, "Employment grade and coronary heart disease in British civil servants" *Journal of Epidemiology and Community Health* **32** 244-249

Marmot M, Wilkinson R G, 2006 *Social Determinants of Health* (Oxford University Press (OUP), Oxford)

Marshall H, Joyce L, 2007, "Disadvantage Marker Study", (DWP, Sheffield) p 100

Menard S, 2002 *Applied Logistic Regression Analysis* (Sage, Thousand Oaks, California, London & New Delhi)

Mitchell R, Shaw M, Dorling D, 2000 *Inequalities in Life and Death: What If Britain Were More Equal?* (Policy Press London)

Moore R, 2008, "I'll be cleared of doping, says shocked Hayles" *The Guardian*, 4th April 2008, page 1

Nazroo J, Williams D, 2006, "Social Determination of Ethnic/Racial Inequalities in Health", in *Social Determinants of Health* Eds M Marmot, R G Wilkinson (Oxford University Press (OUP), Oxford) pp 238-266

Philo C, 1995 *Off the Map : the Social Geography of Poverty in the UK* (Child Poverty Action Group (CPAG), London)

Platt L, Simpson L, Akinwale B, 2005, "Stability and change in ethnic groups in England and Wales", in *Population Trends* (National Statistics, London) p 13

Rigby J, Dorling D, 2007, "Mortality in relation to sex in the affluent world" *Journal of Epidemiology and Community Health* **61** 159-164

Rowthorn R, Webster D, 2008, "Male Worklessness and the Rise of Lone Parenthood in Great Britain" *Cambridge Journal of Regions, Economy and Society* **1** 69-88

Sabel C, Dorling D, Hiscock R, 2007, "Sources of income, wealth and the length of life: An individual level study of mortality" *Critical Public Health* **17** 293-310

Shelton N, Birkin M, Dorling D, 2006, "Where not to live: a geo-demographic classification of mortality for England and Wales, 1981–2000" *Health and Place* **12** 557-569

Smith G, Noble M, Anttila C, Gill L, Zaidi A, Wright G, Dibben C, Barnes H, 2004, " The Value of Linked Administrative Records for Longitudinal Analysis. Report to the ESRC National Longitudinal Strategy Committee", in *Report to the ESRC National Longitudinal Strategy Committee* (Social Disadvantage Research Centre, Oxford University)

Smith R, 1987 *Unemployment and Health: a Disaster and a Challenge* (Oxford University Press, Oxford)

The Scottish Government, 2009, "Scotland's Drinking Habit", http://www.scotland.gov.uk/News/Releases/2009/02/20161722

Tranmer M, Steel D, 2001, "Ignoring a level in a Multilevel Modelling: evidence from UK census data" *Environment and Planning A* **33** 941-948

Tranmer M, Steel D G, 1998, "Using census data to investigate the causes of the ecological fallacy " *Environment and Planning A* **30** 817 -- 831

Uren Z, Fitzpatrick J, Reid A, Goldblatt P, 2001, "Geographic variation in mortality by Social Class and alternative social classifications", in *Geographic Variations in Health* Eds C Griffiths, J Fitzpatrick (The Stationery Office, Norwich) pp 1-377

Voas D, Williamson P, 2001, "The diversity of diversity: a critique of Geodemographic classification" *Area* **33** 63 - 76

Wadsworth M, 1996, "Family and education as determinants of health", in *Health and Social Organisation: towards a Health Policy for the 21st Century* Eds D Blane, E Brunner, R G Wilkinson (Routledge, London & New York)

Walker A, Walker a C, 1997 *Britain Divided : the Growth of Social Exclusion in te 1980s and 1990s* (Child Poverty Action Group, London)

Wallgren A, Wallgren B, 2007 *Register-based Statistics: Administrative Data for Statistical Purposes* (Wiley)

Webster D, 2000, "The geographical concentration of labour-market disadvantage" *Oxford Review of Economic Policy* **16** 114-128

Webster D, 2006, "Welfare Reform: Facing up to the Geography of Worklessness" *Local Economy* **21** 107-116

Wilkinson R G, 1996 *Unhealthy Societies : the afflictions of inequality* (Routledge, London)

Wilkinson R G, 2000 *Mind the Gap : hierarchies, health and human evolution* (Weidenfeld & Nicholson, London)

Wilkinson R G, 2005 *The Impact of Inequality: How to make sick societies healthier* (Routledge, Abingdon, Oxfordshire)

[1] The British form of unemployment benefit.
[2] The British equivalent to a "ministry of labour", which administers cash transfers such as unemployment benefit, sickness benefits, other "welfare" benefits and old-age pensions.
[3] The name for British long-term sickness benefit.
[4] The British form of unemployment benefit.
[5] Which has been highlighted by recent reports of significant losses of personal data by government departments.
[6] State assistance for those who have not paid enough national insurance contributions to receive unemployment benefit, equivalent to "welfare" in the US.
[7] The difference between the -2Log Likelihoods of two models, one *with* and one *without* the variable of interest were compared. The final model was tested by adding each variable one at a time into the model from the beginning and checking that the G_M – the "model chi-squared" was significant at the relevant degrees of freedom.
[8] These have been worked out by entering the unstandardised coefficients into the basic regression model ($y=a + b_1x_1 + b_2x_2 \ldots b_kx_k$) and converting the resultant log-odds to probabilities by reversing the logit transformation process.
[9] Over the subsequent five years of the study period.
[10] http://www.gad.gov.uk/Demography_Data/Life_Tables/Interim_life_tables.asp
[11] Also a potential case of "unobserved heterogeneity" - the variation within the population.
[12] This is known as the "ecological fallacy".