Estimating Census Health Geographies: using synthetic estimation with secondary survey and census data

ES/K003046/1

Project Data Deposit

User Guide

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2015

Award Title	Estimating Census Health Geographies: using synthetic estimation with secondary survey and census data
Award Reference	ES/K003046/1
Location	University of Southampton
Funding Start Date	2013-01-01
Funding End Date	2014-12-31
Award Abstract	This project ran from January 2013 to February 2015 and aimed to examine the use of multilevel synthetic estimation with existing secondary data sets as an alternative methodology to the traditional census. It focussed on the generation of small area data for the health variables included in the UK 2011 Census.

This User Guide summarises three data sets generated via the 'Estimating Census Health Geographies' project and deposited in line with our published intention to make our small area estimates available for secondary use.

Each data set provides estimates of small area health indicators and comparison data from the 2011 UK census. Details are set out below. In all cases the small area estimates were developed using an enhanced version of the multilevel small area estimation procedure originated by Twigg, Moon and Jones.[1] In summary, this procedure involves:

1. Selecting individual data from a sample social survey deposited with the Economic and Social Data Service (ESDS). Selected data comprise Y, a target small area indicator (Limiting long-term illness (LLTI) or self-rated health (SRH)), and a set of candidate variables X1 …Xn that can be used to predict the target indicator. The resultant data set is the 'modelling data set'.
2. Where theoretically justified, expanding the modelling data set as detailed below for each set of estimates by merging data sets and/or linking data on additional predictor variables not available in the original source data.
3. Using the modelling data set to develop a multilevel model with the chosen target variable (Y) as the outcome, and the selected X variables as predictors. The multilevel structure of each model set out below comprised individuals nested within middle layer super output areas (MSOAs; intermediate datazones in Scotland). Details of the coding of the target (output; Y) variable is set out below for each set of estimates and a table is provided setting out the model coefficients associated with the predictor (X) variables in each model. All area-

[1] Twigg, L., Moon, G., and Jones, K. (2000) Predicting small area health-related behaviour: a comparison of smoking and drinking indicators. *Social Science and Medicine*, 50, 1109-1120.

level measures were grand-mean centred and models were built using MLwiN. All models were tested for parsimony using chi-square testing and estimated using Monte Carlo Markov Chain (MCMC) methods. The model coefficients can be thought of as weights that summarise the independent effect of each X on the chosen outcome (Y).

4. Assembling local area data for the X variables identified in the models. This local area data set was assembled for all MSOAs level in England and Wales and Scottish intermediate datazones. It was derived from the 2011 UK census, a UK wide indicator of (multiple) deprivation and benefit data as required for each model set out below. The data set comprises one row per MSAO/intermediate datazonefor each age/sex grouping identified in the model. These grouping are identied by indicator variables and counts for each age and sex category were derived from census cross-tabulations. Area variables were centred on the group mean identified in the modelling data set.
5. Weighting each local area data item by the relevant coefficient from the multilevel model. For each MSOA/intermediate datazone, each variable is multiplied by the relevant coefficient from the multilevel model. The results are then summed to give one distinct value for each age/sex grouping in eachMSOA/datazone. This figure is a logit measuring the likelihood that an individual in a particular age/sex grouping in each MSOA/datazone has the outcome of interest.
6. Transform this logit to a probability (range 0 to 1) and multiply it by the total population in the age/sex grouping in the particular MSOA/datazone. This tells us how many people in the age/sex grouping in each MSOA/datazone have the outcome of interest. We can then sum these are calculate a prevalence rate with respect to the total population of the MSOA/datazone.
7. As part of the MCMC estimation of the multilevel models that underpin the small area estimation process it is possible to save the model coefficients at each stage of the iterative MCMC process. We take a random sample of 1000 of these iterations and re-run stages 5 and 6 above for each set of coefficients. This process generates 1000 estimates. We select the 2.5th and the 97.5th percentile values to produce 95% credible intervals for each MSOA/datazone estimate.

Data set one

Filename: Great Britain Small Area Health Estimates

Content: Small area estimates of poor self-rated health and limiting long-term illness, associated 95% Bayesian credible intervals, 2011 Census data on the same topics for comparison. Model-based estimates for England, Wales and Scotland based on linked survey data from respective national surveys.

Spatial resolution: Middle Layer Super Output Areas (England and Wales), Intermediate Datazones (Scotland)

Variables in data set:

	Variable Name	Variable Label	Notes
1	Country	GB Country	England, Wales, Scotland
2	MSOA_Name	MSOA Name	ONS/GRoS Middle Layer Super Output Area Name (Intermediate Datazone name in Scotland)
3	MSOA	MSOA Code	ONS/GRoS Middle Layer Super Output Area Code (Intermediate Datazone code in Scotland)
4	CensusPSRH	2011 Census Poor Self-Rated Health %	Downloaded for England and Wales from the ONS official labour market statistics website (NOMIS) and for Scotland from the Scottish Census data warehouse website. 'Fair', 'bad' or 'very bad' general health was coded as PSRH. Age 16+
5	SAEPSRH	SAE Poor Self-Rated Health %	Small area estimate derived from multilevel model of 23,374 participants (16+ years) from the linked and combined 2011 waves of the Health Survey for England (n=8,603), the Scottish Health Survey (n=7,537) and the Welsh Health Survey (n=7,234). Modelled variables were age, sex (individual level), and, at the area level, disability benefits (defined as combined rate of Disability Living Allowance and attendance allowance) per 1,000 adults per MSOA, and working age benefits (defined as combined rate of incapacity benefit plus Severe Disablement Allowance plus Employment and Support Allowance benefits) per 1,000 adults per MSOA and a UK-wide Index of Deprivation (ID) score, calibrated from the English, Scottish and Welsh versions of the index. Additional fixed effect dummy variables identified the different countries in which an MSOA /datazone is located. Both benefit measures were derived from the Department of Work and Pensions (DWP) neighbourhood statistics website
6	SAEPSRHCIlow	SAE Poor Self-Rated Health lower 95% CI	95% Bayesian Credible Interval for the small area estimate of poor self-rated health (lower limit).
7	SAEPSRHCIhi	SAE Poor Self-Rated Health upper 95% CI	95% Bayesian Credible Interval for the small area estimate of poor self-rated health (upper limit).
8	CensusLLTI	2011 Census Limiting Long-term Illness %	Downloaded for England and Wales from the ONS official labour market statistics website (NOMIS) and for Scotland from the Scottish Census data warehouse website. 'Yes, limited a lot' and 'yes, limited a little' were coded as having a LLTI. Age 16+

9	SAELLTI	SAE Limiting Long-term Illness %	Small area estimate derived from multilevel model of 23,374 participants (16+ years) from the linked and combined 2011 waves of the Health Survey for England (n=8,603), the Scottish Health Survey (n=7,537) and the Welsh Health Survey (n=7,234). Modelled variables were age, sex (individual level), and, at the area level, disability benefits (defined as combined rate of Disability Living Allowance and attendance allowance) per 1,000 adults per MSOA, and working age benefits (defined as combined rate of incapacity benefit plus Severe Disablement Allowance plus Employment and Support Allowance benefits) per 1,000 adults per MSOA and a UK-wide Index of Deprivation (ID) score, calibrated from the English, Scottish and Welsh versions of the index. Additional fixed effect dummy variables identified the different countries. Both benefit measures were derived from the Department of Work and Pensions (DWP) neighbourhood statistics website
10	SAELLTICIlow	SAE Limiting Long-term Illness lower 95% CI	95% Bayesian Credible Interval for the small area estimate of limiting long-term illness (lower limit).
11	SEALLTICIhi	SAE Limiting Long-term Illness upper 95% CI	95% Bayesian Credible Interval for the small area estimate of limiting long-term illness (upper limit).

Underlying model parameters:

	PSRH model		**LLTI model**	
	Logit	**Standard Error**	**Logit**	**Standard Error**
Intercept	-2.470	0.137	-2.422	0.122
Sex: Female	0.059	0.032	0.151	0.031
Age: 20-24	0.188	0.165	-0.193	0.156
Age: 25.29	0.339	0.157	0.178	0.143
Age: 30-34	0.208	0.156	0.173	0.140
Age: 35-39	0.680	0.148	0.455	0.135
Age: 40-44	0.863	0.144	0.654	0.131
Age: 45-49	1.168	0.142	0.984	0.129
Age: 50-54	1.465	0.142	1.281	0.128
Age: 55-59	1.650	0.142	1.436	0.128
Age: 60-64	1.758	0.140	1.671	0.127
Age: 65-69	1.886	0.141	1.816	0.128
Age: 70-74	2.086	0.143	2.023	0.130
Age: 75+	2.541	0.138	2.617	0.126
IMD	0.023	0.003	0.011	0.003
Disability Benefits	0.002	0.001	0.002	0.001
Work Benefits	-0.001	0.001	-	-
Scotland	0.150	0.110	0.319	0.046
Wales	-0.456	0.056	0.469	0.049

Italics = area level variables

Data Set Two

Filename: Small Area Health Estimates Using Aggregated and Linked Area Data

Content: Small area estimates of limiting long-term illness (severe and not severe), 2011 Census data for comparison. Model-based estimates for England based on survey data from the Crime Survey for England and Wales. This data set shows how small area estimates vary with respect to differences in the disclosure of area-level covariates.

Spatial resolution: Middle Layer Super Output Areas (England only).

Variables in data set:

	Variable Name	**Variable Label**	**Notes**
1	MSOA	MSOA code	ONS Middle Layer Super Output Area Code
2	SAELLTIa	SAE LLTI (IMD Deciles model) %	Small area estimate derived from multilevel model of 46,597 participants (16+ years) from the 2010/11 sweep of the Crime Survey for England and Wales, geocoded version available via special licence from the UK Data Service. Modelled variables were age, sex (individual level), and, at the area level, the provided deciles of the English Deprivation Index (ID). Many secondary data sets routinely attach ID quantiles.
3	SAELLTIb	SAE LLTI (Raw IMD model) %	Small area estimate derived from multilevel model of 46,597 participants (16+ years) from the 2010/11 sweep of the Crime Survey for England and Wales, geocoded version available via special licence from the UK Data Service. Modelled variables were age, sex (individual level), and, at the area level, linked raw values of the English Deprivation Index (ID). Few data sets routinely disclose the spatial identifiers that enable the linkage of raw ID data.
4	SAELLTIc	SAE LLTI (Unemployment census linked model) %	Small area estimate derived from multilevel model of 46,597 participants (16+ years) from the 2010/11 sweep of the Crime Survey for England and Wales, geocoded version available via special licence from the UK Data Service. Modelled variables were age, sex (individual level), and, at the area level, the percentage of people living in the MSOA who were unemployed, calculated as the percentage of residents unemployed from the 2011 Census, linked to the survey data via geocoding. Few data sets routinely disclose the spatial identifiers that enable the linkage of specific census data on where respondents live.
5	SAELLTId	SAE LLTI (Unemployment survey aggregated model) %	Small area estimate derived from multilevel model of 46,597 participants (16+ years) from the 2010/11 sweep of the Crime Survey for England and Wales, geocoded version available via special licence from the UK Data Service. Modelled variables were age, sex (individual level), and, at the area level, the percentage of people living in the MSOA who were unemployed, calculated as the

	Variable Name	Variable Label	Notes
			percentage of crime survey respondents unemployed for each MSOA. Many surveys routinely provide survey cluster indicators that can be used as a basis for aggregating survey respondents to create pseudo area indicators.
6	CensusLLTI	2011 Census LLTI % individuals (aged 16+) with an LLTI	Downloaded for England and Wales from the ONS official labour market statistics website (NOMIS). 'Yes, limited a lot' and 'yes, limited a little' were coded as having a LLTI. Age 16+

Underlying Model Parameters:

	IMD Decile Model		Raw IMD Model		Linked Census Model		Aggregated Respondent Model	
	Logit	Standard Error	Logit	Standard Error	Logit	Standard Error	Logit	Standard Error
Intercept	-2.722	0.196	-3.91	0.199	-4.008	0.201	-3.421	0.2
Female	0.095	0.026	0.096	0.026	0.098	0.027	0.101	0.027
Age 18 to 19	0.114	0.267	0.113	0.271	0.085	0.27	0.155	0.271
Age 20 to 24	0.507	0.21	0.496	0.214	0.458	0.215	0.546	0.215
Age 25 to 29	0.65	0.204	0.639	0.209	0.62	0.208	0.698	0.208
Age 30 to 34	0.696	0.203	0.689	0.208	0.637	0.208	0.722	0.208
Age 35 to 39	1.025	0.2	1.019	0.204	0.992	0.204	1.028	0.204
Age 40 to 44	1.203	0.198	1.203	0.203	1.179	0.202	1.203	0.203
Age 45 to 49	1.471	0.197	1.468	0.201	1.441	0.201	1.461	0.202
Age 50 to 54	1.744	0.197	1.741	0.202	1.723	0.201	1.738	0.201
Age 55 to 59	1.952	0.196	1.949	0.201	1.925	0.2	1.939	0.201
Age 60 to 64	2.18	0.195	2.182	0.2	2.162	0.199	2.168	0.2
Age 65 to 69	2.442	0.195	2.448	0.2	2.434	0.199	2.422	0.2
Age 70 to 74	2.681	0.196	2.681	0.2	2.671	0.2	2.662	0.2
Age 75 to 79	3.106	0.196	3.11	0.201	3.089	0.2	3.095	0.201
Age 80 to 84	3.384	0.198	3.388	0.202	3.373	0.202	3.364	0.202
Age 85 and over	3.942	0.201	3.942	0.205	3.925	0.205	3.924	0.205
IMD Decile 2nd most deprived	-0.208	0.059						
3rd	-0.419	0.062						
4th	-0.541	0.063						
5th	-0.694	0.063						
6th	-0.81	0.063						
7th	-0.837	0.063						
8th	-0.92	0.064						
9th	-0.947	0.064						
Least deprived	-1.066	0.065						
MSOA IMD (raw)			0.026	0.001				

	IMD Decile Model		Raw IMD Model		Linked Census Model		Aggregated Respondent Model	
	Logit	**Standard Error**	**Logit**	**Standard Error**	**Logit**	**Standard Error**	**Logit**	**Standard Error**
Unemployment (census Linked)					14.936	0.691		
Unemployment (aggregated respondent characteristics)							1.675	0.254

Italics = area level variables

Data Set Three

Filename: Small Area Health Estimates Comparing Approaches to Modelling

Content: Small area estimates of limiting long-term illness, 2011 Census data for comparison. Model-based estimates for England and Wales based on survey data from the Crime Survey for England and Wales. This data set shows how small area estimates vary with respect to differences in the modelling of outcome variables and the parameterisation of age.

Spatial resolution: Middle Layer Super Output Areas (England and Wales).

Variables in data set:

	Variable Name	Variable Label	Notes
1	MSOA	2011 MSOA codes	ONS Middle Layer Super Output Area Code
2	LLTIsevere	SAE Severe LLTI (Multinomial Categorical Age) %	Small area estimate derived from multilevel model of 46,597 participants (16+ years) from the 2010/11 sweep of the Crime Survey for England and Wales, geocoded version available via special licence from the UK Data Service. Modelled variables were banded age, sex (individual level), and, at the area level, linked raw MSOA-level values from a UK-wide Index of Deprivation (ID) score calibrated from the English, Scottish and Welsh versions of the index, combined MSOA-level receipt of Attendance Allowance and Disability Living Allowance (per 10,000 people) sourced from the UK Department of Work and Pensions, and the ONS urban-rural typology classifying MSOAs as urban, town/urban fringe, or rural (village, hamlet or isolated dwellings). Outcomes were modelled as multinomial variables; this variable reports the percentage of individuals reporting severely limiting long-term illness.
3	LLTInotsevere	SAE Not Severe LLTI (Multinomial Categorical Age) %	Small area estimate derived from multilevel model of 46,597 participants (16+ years) from the 2010/11 sweep of the Crime Survey for England and Wales, geocoded version available via special licence from the UK Data Service. Modelled variables were banded age, sex (individual level), and, at the area level, linked raw MSOA-level values from a UK-wide

	Variable Name	Variable Label	Notes
			Index of Deprivation (ID) score calibrated from the English, Scottish and Welsh versions of the index, combined MSOA-level receipt of Attendance Allowance and Disability Living Allowance (per 10,000 people) sourced from the UK Department of Work and Pensions, and the ONS urban-rural typology classifying MSOAs as urban, town/urban fringe, or rural (village, hamlet or isolated dwellings). Outcomes were modelled as multinomial variables; this variable reports the percentage of individuals reporting long-term illness that is NOT severely limiting.
4	noLLTI	SAE No LLTI (Multinomial Categorical Age) %	Small area estimate derived from multilevel model of 46,597 participants (16+ years) from the 2010/11 sweep of the Crime Survey for England and Wales, geocoded version available via special licence from the UK Data Service. Modelled variables were banded age, sex (individual level), and, at the area level, linked raw MSOA-level values from a UK-wide Index of Deprivation (ID) score calibrated from the English, Scottish and Welsh versions of the index, combined MSOA-level receipt of Attendance Allowance and Disability Living Allowance (per 10,000 people) sourced from the UK Department of Work and Pensions, and the ONS urban-rural typology classifying MSOAs as urban, town/urban fringe, or rural (village, hamlet or isolated dwellings). Outcome calculated as 100-(variable 2+variable 3); this variable reports the percentage of individuals reporting NO limiting long-term illness.
5	CensusLLTIsevere	2011 Census LLTI Severe %	Downloaded for England and Wales from the ONS official labour market statistics website (NOMIS). 'Yes, limited a lot'. Age 16+
6	CensusLLTInotsevere	2011 Census LLT Not Severe %	Downloaded for England and Wales from the ONS official labour market statistics website (NOMIS). 'Yes, limited a little'. Age 16+
7	CensusnoLLTI	2011 Census No LLTI %	Downloaded for England and Wales from the ONS official labour market statistics website (NOMIS). Not reporting any limiting long-term illness. Age 16+
8	LLTIsevere2	SAE Severe LLTI (Logistic) %	Small area estimate derived from multilevel model of 46,597 participants (16+ years) from the 2010/11 sweep of the Crime Survey for England and Wales, geocoded version available via special licence from the UK Data Service. Modelled variables were banded age, sex (individual level), and, at the area level, linked raw MSOA-level values from a UK-wide Index of Deprivation (ID) score calibrated from the English, Scottish and Welsh versions of the index, combined MSOA-level receipt of Attendance Allowance and Disability Living Allowance (per

	Variable Name	Variable Label	Notes
			10,000 people) sourced from the UK Department of Work and Pensions, and the ONS urban-rural typology classifying MSOAs as urban, town/urban fringe, or rural (village, hamlet or isolated dwellings). Outcome modelled as binomial contrast of severe LLTI versus no LLTI; this variable reports the percentage of individuals reporting severely limiting long-term illness.
9	LLTInotsevere2	SAE Not Severe LLTI (Logistic) %	Small area estimate derived from multilevel model of 46,597 participants (16+ years) from the 2010/11 sweep of the Crime Survey for England and Wales, geocoded version available via special licence from the UK Data Service. Modelled variables were banded age, sex (individual level), and, at the area level, linked raw MSOA-level values from a UK-wide Index of Deprivation (ID) score calibrated from the English, Scottish and Welsh versions of the index, combined MSOA-level receipt of Attendance Allowance and Disability Living Allowance (per 10,000 people) sourced from the UK Department of Work and Pensions, and the ONS urban-rural typology classifying MSOAs as urban, town/urban fringe, or rural (village, hamlet or isolated dwellings). Outcome modelled as binomial contrast of non-severe LLTI versus no LLTI; this variable reports the percentage of individuals reporting non-severe limiting long-term illness.
10	noLLTI2	SAE No LLTI (Logistic) %	Small area estimate derived from multilevel model of 46,597 participants (16+ years) from the 2010/11 sweep of the Crime Survey for England and Wales, geocoded version available via special licence from the UK Data Service. Modelled variables were banded age, sex (individual level), and, at the area level, linked raw MSOA-level values from a UK-wide Index of Deprivation (ID) score calibrated from the English, Scottish and Welsh versions of the index, combined MSOA-level receipt of Attendance Allowance and Disability Living Allowance (per 10,000 people) sourced from the UK Department of Work and Pensions, and the ONS urban-rural typology classifying MSOAs as urban, town/urban fringe, or rural (village, hamlet or isolated dwellings). Outcome calculated as 100-(variable8+variable9); this variable reports the percentage of individuals reporting no limiting long-term illness.
11	LLTIsevere3	SAE Severe LLTI (Orthogonal Polynomial Age) %	Small area estimate derived from multilevel model of 46,597 participants (16+ years) from the 2010/11 sweep of the Crime Survey for England and Wales, geocoded version available via special licence from the UK Data Service. Modelled variables were an

	Variable Name	Variable Label	Notes
			orthogonal parameterisation of age, sex (individual level), and, at the area level, linked raw MSOA-level values from a UK-wide Index of Deprivation (ID) score calibrated from the English, Scottish and Welsh versions of the index, combined MSOA-level receipt of Attendance Allowance and Disability Living Allowance (per 10,000 people) sourced from the UK Department of Work and Pensions, and the ONS urban-rural typology classifying MSOAs as urban, town/urban fringe, or rural (village, hamlet or isolated dwellings). Outcomes were modelled as multinomial variables; this variable reports the percentage of individuals reporting severely limiting long-term illness. The model uses an orthogonal parameterisation of the age variable to reduce the modelled parameters from 15 categorical bands to a single value.
12	LLTInotsevere3	SAE Not Severe LLTI (Orthogonal Polynomial Age) %	Small area estimate derived from multilevel model of 46,597 participants (16+ years) from the 2010/11 sweep of the Crime Survey for England and Wales, geocoded version available via special licence from the UK Data Service. Modelled variables were an orthogonal parameterisation of age, sex (individual level), and, at the area level, linked raw MSOA-level values from a UK-wide Index of Deprivation (ID) score calibrated from the English, Scottish and Welsh versions of the index, combined MSOA-level receipt of Attendance Allowance and Disability Living Allowance (per 10,000 people) sourced from the UK Department of Work and Pensions, and the ONS urban-rural typology classifying MSOAs as urban, town/urban fringe, or rural (village, hamlet or isolated dwellings). Outcomes were modelled as multinomial variables; this variable reports the percentage of individuals reporting long-term illness that is not limiting. The model uses an orthogonal parameterisation of the age variable to reduce the modelled parameters from 15 categorical bands to a single value.
13	noLLTI3	SAE No LLTI (Orthogonal Polynomial Age) %	Small area estimate derived from multilevel model of 46,597 participants (16+ years) from the 2010/11 sweep of the Crime Survey for England and Wales, geocoded version available via special licence from the UK Data Service. Modelled variables were an orthogonal parameterisation of age, sex (individual level), and, at the area level, linked raw MSOA-level values from a UK-wide Index of Deprivation (ID) score calibrated from the English, Scottish and Welsh versions of the index, combined MSOA-level receipt of Attendance Allowance and Disability Living

	Variable Name	Variable Label	Notes
			Allowance (per 10,000 people) sourced from the UK Department of Work and Pensions, and the ONS urban-rural typology classifying MSOAs as urban, town/urban fringe, or rural (village, hamlet or isolated dwellings). Outcome calculated as 100-(variable 11+variable 12); this variable reports the percentage of individuals reporting no limiting long-term illness. The model uses an orthogonal parameterisation of the age variable to reduce the modelled parameters from 15 categorical bands to a single value.

Underlying Model Parameters:

Multinomial Outcome, categorical age				
	Severely Limited		**Limited, but not severely**	
	Logit	**Standard Error**	**Logit**	**Standard Error**
Intercept	-4.98	0.29	-3.37	0.15
Male	-0.06	0.04	-0.12	0.03
Town and Fringe	0.00	0.08	0.00	0.05
Village, Hamlet Isolated	-0.25	0.08	-0.07	0.05
IMD	0.44	0.04	0.31	0.03
IMD Square	-0.04	0.02	-0.05	0.01
Disability Benefits %	0.11	0.03	0.47	0.03
Age 20-24	0.39	0.04	0.51	0.17
25-29	0.58	0.33	0.61	0.16
30-34	0.89	0.32	0.60	0.16
35-39	1.30	0.31	0.90	0.16
40-44	1.56	0.31	1.10	0.15
45-49	1.93	0.31	1.32	0.15
50-54	2.20	0.31	1.59	0.15
55-59	2.42	0.31	1.78	0.15
60-64	2.64	0.30	2.04	0.15
65-69	2.89	0.30	2.30	0.15
70-74	3.20	0.30	2.50	0.15
75-79	3.58	0.30	2.90	0.15
80-84	4.07	0.30	3.14	0.15
85 and over	4.86	0.30	3.55	0.16

Italics = area level variables

Binomial Outcomes, categorical age				
	Severely Limited		Limited, but not severely	
	Logit	Standard Error	Logit	Standard Error
Intercept	-4.99	0.30	-3.37	0.15
Male	-0.05	0.04	-0.12	0.03
Town and Fringe	0.00	0.08	0.00	0.05
Village, Hamlet Isolated	-0.23	0.08	-0.08	0.05
IMD	0.43	0.04	0.31	0.03
IMD Square	-0.04	0.02	-0.05	0.01
Disability Benefits %	0.12	0.04	0.44	0.03
Age 20-24	0.38	0.35	0.51	0.17
25-29	0.58	0.33	0.61	0.16
30-34	0.88	0.32	0.60	0.16
35-39	1.30	0.31	0.90	0.16
40-44	1.56	0.31	1.10	0.15
45-49	1.94	0.31	1.32	0.15
50-54	2.21	0.31	1.56	0.15
55-59	2.43	0.30	1.79	0.15
60-64	2.65	0.30	2.05	0.15
65-69	2.90	0.30	2.30	0.15
70-74	3.21	0.30	2.50	0.15
75-79	3.57	0.30	2.90	0.15
80-84	4.07	0.30	3.14	0.15
85 and over	4.87	0.30	3.55	0.16

Italics = area level variables

Multinomial Outcome, orthogonal parameterisation of age				
	Severely Limited		Limited, but not severely	
	Logit	Standard Error	Logit	Standard Error
Intercept	-2.83	0.05	-1.70	0.03
Male	-0.07	0.04	-0.12	0.03
Town and Fringe	0.00	0.08	0.00	0.05
Village, Hamlet Isolated	-0.25	0.08	-0.07	0.05
IMD	0.44	0.04	0.31	0.03
IMD Square	-0.04	0.02	-0.05	0.01
Disability Benefits %	0.11	0.04	0.05	0.03
Age	5.14	0.16	3.91	0.08
Age Square	0.06	0.14	0.41	0.07
Age Cubed	0.70	0.11	0.03	0.07

Italics = area level variables