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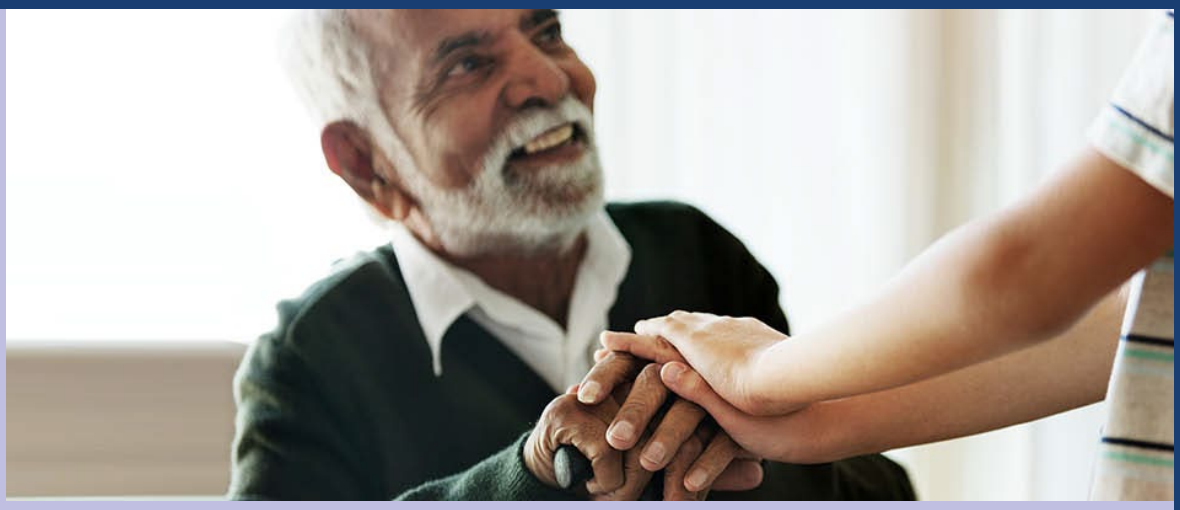

Using individual and neighbourhood profiles and trends to understand frailty with nationally representative population data

Part 1: Frailty among older adults and its distribution in England

David Sinclair, Asri Maharani, Joy Adamson, Peter Bower, Tarani Chandola, Barbara Hanratty, James Nazroo, Gindo Tampubolon, Chris Todd, Raphael Wittenberg, Fiona Matthews, Neil Pendleton

Final Report

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Background

As the English population ages, the number of people living with frailty is rising. Currently, one in five (18%) people (over 12 million) are aged over 65 years [1]. By 2038, this will have risen to one in four (24%) [2]. Estimates suggest that there are 1.8 million people in England aged over 60 and living with frailty, almost half of these are over 80 [3]. Frailty is associated with poor quality of life, adverse health outcomes, such as falls, and increased use of health and social care services [4-6]. Previous research has shown that frailty is not an inevitable consequence of ageing [7]. Preventing frailty is an important issue, which promotes the health well-being of older people and may reduce their need for NHS and social care.

Frailty has been described as a distinctive health state related to the ageing process, in which multiple body systems gradually lose their in-built reserves [8-10]. There are two operational definitions of frailty in common use: the frailty phenotype and frailty index. The frailty phenotype, proposed by Fried [8], describes a group of individual characteristics (weakness, slowness, low level of physical activity, exhaustion, and unintentional weight loss) that predict poor outcomes. A person is judged to be frail if they have at least three of five characteristics, pre-frail if they have one or two characteristics, and robust if they have none of the characteristics. The frailty index, or cumulative deficit model, was developed by Rockwood [11]. In this model, as people age, they accumulate 'deficits' that increase their risk of poor outcomes. Deficits range from conditions (such as dementia), to symptoms (e.g. hearing loss) and signs (e.g. tremor). The number of deficits acquired by an individual is used to calculate a frailty index.

To plan for prevention or the care of people with frailty, policymakers and commissioners require information on where input is needed. Our current understanding of how frailty is distributed geographically comes from one multinational study [12], and four others from single countries (the USA [13], Australia [14, 15], China [16]). This research has described geographical variation in frailty, but is limited by a focus on single-gender samples, and adoption of a regional perspective. In England, frailty in hospital patients has been mapped to Primary Care Trust areas, using surrogate diagnostic codes [17]. To date, there have been no national, community based studies on the distribution of frailty in England. All of the previous work has focused on the production of a single national or UK figure for frailty, due to the absence of estimates of frailty at a small area level.

The aim of this study was to address this gap in our knowledge. We investigate the area level distribution of frailty in England, using synthetic estimation to derive small-area profiles of pre-frailty and frailty prevalence. This allows for the description of pre-frailty and frailty to be undertaken across policy-relevant areas such as local authority districts.

Approach

Data sources

This study drew on four different data sources for the analysis: (1) the English Longitudinal Study of Ageing (ELSA); (2) the Cognitive Function and Ageing Study II (CFAS II); (3) 2011 UK Townsend Deprivation Scores; and (4) 2020 Office for National Statistics population projections for local authorities.

ELSA and CFAS II were the primary sources of individual-level data. ELSA is a prospective cohort study of approximately 18,000 adults aged 50 or older resident in England [18]. ELSA uses a panel design, in which the same respondents are interviewed every two years, with new survey participants added in waves 3, 4, 6, 7 and 9 to adjust for ageing and attrition. In our analysis, we included only 65+ years old in the ELSA Wave 4 sample (interviewed in 2008/2009). Sampling weights (the inverse of the probability of the individual getting selected) were assigned for these individuals.

The Cognitive Function and Ageing Study II (CFAS II) is a population-based study of people aged 65 and older in England [19]. Data are available for 7762 individuals residing in three geographic areas: Newcastle upon Tyne, Nottingham (both urban), and Cambridgeshire (rural). Baseline data were collected from 2008-2011.

Data collection within both ELSA and CFAS II includes demographic and socioeconomic characteristics, along with information on lifestyle, and health and social care use.

The 2011 UK Townsend deprivation scores [20] and 2020 population projections for local authorities were obtained from Office for National Statistics [2]. The Townsend scores measure material deprivation at Lower Layer Super Output Area (LOSA) and LAD levels, based on data collected in the UK census. The 2020 population projections provide information on the provisional population counts disaggregated to LADs for England. We tabulated population census counts for each local authority district stratified by age and gender.

The individual-level measures

Individual-level variables were taken from ELSA wave 4 and CFAS II. A frailty index was constructed for each dataset, from variables or deficits representing conditions that a) accumulate with age and b) are associated with adverse outcomes. Deficits included functional and sensory impairments, clinical diagnoses, and poor cognitive function. ELSA and CFAS contain similar, but not identical variables, which led us to use a different frailty index for each study, in accordance with guidelines [26]. For ELSA, we used the frailty index described by Wade and colleagues [22]. We adapted the frailty index previous used by Mousa and colleagues [23] in their comparison of CFAS I and CFAS II, adding 12 variables which are present in CFAS II, but not CFAS I. The full list of variables included in both frailty indices is presented in **Appendix 1**.

All binary variables are recoded, using the convention that ‘0’ indicates absence and ‘1’ presence of a deficit. For ordinal and continuous variables, coding is based on the distribution of the data. Deficit points are summed for each individual, and divided by

the total number of deficits, to produce a frailty index with a range from 0 to 1. Higher scores indicate greater frailty. Missing data have been imputed using multiple imputation by chained equations [24]. Following Clegg et al. [25], we categorised the frailty index into frailty (> 0.36), pre-frailty (>0.24-0.36) and non-frailty (≤0.24).

The list of individual-level covariates and their definitions are provided in **Appendix 2**. Using the geographic variable in ELSA, we assigned a local authority level Townsend deprivation score to each respondent, while a postcode-level deprivation score is assigned to participants in CFAS II. Townsend deprivation scores were categorised into quintiles, grouping broadly similar areas of deprivation together.

The area-level measures

The list of variables at area level and their definitions are provided in **Appendix 2.** Forecast 2020 populations for each local authority in England, split into gender and five-year age bands were obtained from the Office for National Statistics [2]. The forecast populations are rounded to the nearest 100, leading to population estimates of zero for some age bands in two small local authorities (Isles of Scilly and City of London). Consequently 2018 mid-year population estimates [1] (which are estimated to the nearest integer) were substituted for these locations.

Townsend deprivation scores for each local authority, based on 2011 census data, were obtained from the Office for National Statistics [20]. The Townsend deprivation index is a composite score of four variables available in the Census relating to unemployment, car ownership, home ownership, and overcrowding [26]. Data for the Isles of Scilly and City of London were merged with neighbouring local authorities (Cornwall and Westminster, respectively), so Townsend deprivation scores are only available for the merged local authority districts. We assigned the merged score to the constituent authorities.

Local authority boundaries have changed since the 2011 census and the time when the population forecasts were generated [27-30]. Further changes are due to take effect 1 April 2020, which we have accounted for in this study [31]. These changes all involve the merging of local authority districts to produce LADs covering larger areas. We summed the precursor local authority population forecasts to estimate the successor authorities' populations. Townsend deprivation scores were estimated by a population-weighted average of the precursor authorities' scores.

Data analysis

Small area estimation is a statistical method for generating estimates in small geographical areas that would otherwise not have enough representative samples to derive precise direct estimates [32]. This approach was used to create area estimates for the 314 LADs (as of 1 April 2020) in England. Our outcome measure for analysis is the prevalence estimate for pre-frailty and frailty. The small area estimation approach obtained the small area statistics by modelling each of individual-level outcome measures from the ELSA and CFAS II, against a set of external area-level covariates collected from a range of sources using a logistic regression model. The parameter estimates from the logistic regression model were then used to calculate the predicted prevalence at the area level directly.

To account for the differing profiles of demographic and socioeconomic across the LADs, area-level estimates were obtained for each LAD separately by those factors. This was done by including the individual-measures of each group as demographic and socioeconomic from the ELSA and CFAS II as covariates in the model, and then, for each LAD, generating the predicted prevalence for each group. These were then combined to give estimates of frailty prevalence for all older adults in each LAD.

The analysis was conducted in several steps. First, the frailty index was generated and extracted from ELSA Wave 4 and CFAS II for respondents aged 65+ years, along with their age, gender and local authority district deprivation level (measured by Townsend deprivation score). Next, a generalised ordinal logistic regression [38, 39] was used to investigate the association between pre-frailty, frailty and age, gender and deprivation in each study. Fitting was conducted with Stata's gologit2 program [40]. Complete information for all deficits in frailty index was available for 6737 CFAS II participants and 4313 ELSA Wave 4 participants. Inverse probability weighting was used to account for non-response in both surveys (44% in CFAS II and 26% in ELSA Wave 4). A possible interaction effect between frailty, age and gender were tested in both surveys.

Missing data on the frailty index variables (13.2% of participants of CFAS II and 15.1% in ELSA Wave 4) were handled by multivariate imputation by chained equations (MICE) [36] (using Stata's mi program [37]). Twenty imputations were used. The model included both studies and adjusted for study effect. A hierarchical model with random study effects was evaluated and found to generate similar estimates. Estimates for the distribution of frailty in England were produced by applying the model fit from the combined analysis to local authority demographic data.

Forecast 2020 populations for each local authority in England, split into gender, and five-year age bands were obtained from the Office for National Statistics. The CFAS II and ELSA Wave 4 age bands (65-69; 70-74; 75-79; 80-84; 85-89; 90+) were harmonised with those of the population forecasts.

Results

Pre-frailty and frailty prevalence

The 2020 England prevalence of pre-frailty and frailty among adults aged 65+ years was estimated at 2.7% and 1.2%, respectively. Those estimates were higher among women (3.4% for pre-frailty and 1.5% for frailty) than men (2.0% for pre-frailty and 0.8% for frailty). Table 1 indicates how sex-specific estimates of pre-frailty and frailty vary with age. The prevalence of pre-frailty and frailty increased steeply with advancing age. Our estimates suggest that over 21% of women aged 90+ and 15% of men at the same age in England are frail in 2020.

Table 1 Estimated pre-frailty and frailty prevalence in 2020 by sex and age using data from ELSA Wave 4 and CFAS II

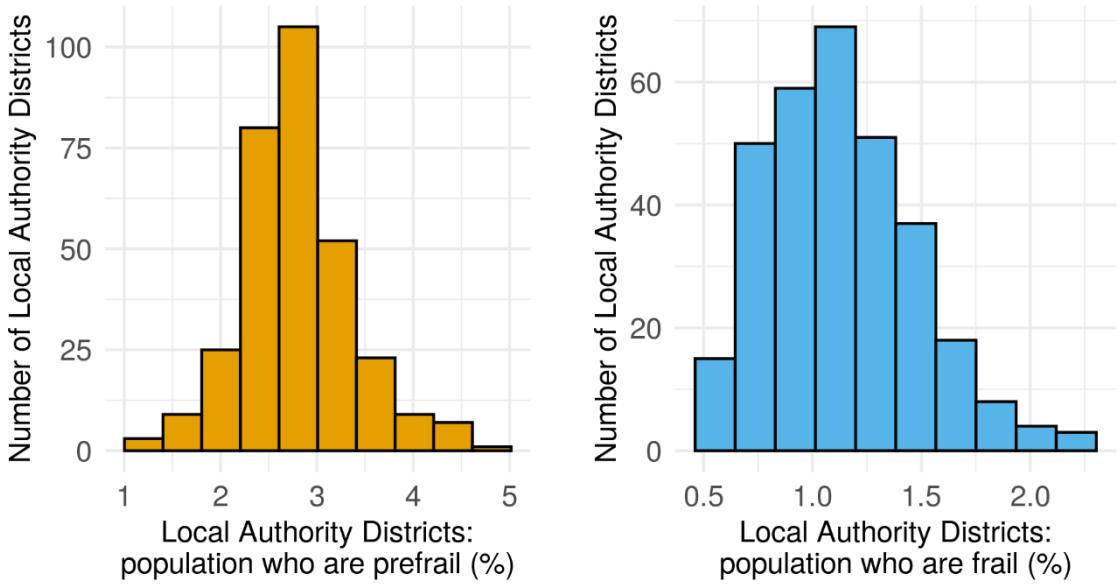
Age group	Males (%)	Females (%)	All Persons (%)
Pre-frailty			
65-69	6.2	9.1	7.7
70-74	8.4	12.1	10.3
75-80	11.9	16.7	14.4
80-84	16.8	22.5	19.9
85-89	22.9	28.7	26.4
90+	38.1	42.4	41.0
Frailty			
65-69	2.5	3.7	3.1
70-74	3.7	5.5	4.7
75-80	4.2	6.3	5.3
80-84	6.3	9.3	8.0
85-89	9.9	14.2	12.5
90+	15.2	21.3	19.3

Geographical differences

The prevalence of pre-frailty and frailty across the 314 LADs for England in 2020 is shown in Figure 1. The lowest pre-frailty prevalence is 1.1%, and the highest is

4.7%, of the total population of a LAD. The average pre-frailty prevalence across LADs is around 2.8%, with a standard deviation of 0.6%. Substantial regional variations can also be seen in the frailty estimates. Frailty prevalence estimates showed a fourfold variation, from 0.5% to 2.2% (mean 1.1%; standard deviation 0.3%). The pre-frailty and frailty estimates for all LADs are given in **Appendix 3**.

Figure 1: Prevalence (A) pre-frailty and (B) frailty across Local Authority Districts in England, 2020



(a) (b)

Figures 2 and 3 map the spatial distribution of pre-frailty prevalence estimates across England for males and females. The highest estimates are predominantly found in coastal areas, such as of East Lindsey (Lincolnshire), Tendring (Essex), Thanet (Kent), the Isle of Wight and Scarborough (North Yorkshire) where prevalence are predicted to be above 3.2% of males and 5.3% of females. The lowest estimates (lower than 1.2% of males and 1.9% of females) are clustered around the urban areas of inner London (Tower Hamlets, Hackney, Southwark, and Lambeth) and outer London (Newham). High prevalence estimates for pre-frailty in the City of London are likely to be unreliable because of the population size and use of a Townsend score derived from data from neighbouring Westminster.

Figures 4 and 5 show frailty prevalence estimates across England. The estimates are similar to those for pre-frailty, with a high prevalence of frailty in coastal areas. The areas with high estimated frailty include East Lindsey, Scarborough, Tendring, Isle of Wight, plus Torbay where prevalence is predicted to be above 1.4% and 2.7% for males and females, respectively. The lowest estimates of frailty prevalence are found in London (Tower Hamlets) and areas around London, including Wokingham

(Berkshire), St. Albans (Hertfordshire) and East Hertfordshire (less than 0.5% and 0.8% of males and females, respectively). South Derbyshire is also estimated to have a low prevalence of frailty. As both frailty and pre-frailty have similar relationship with age, sex and deprivation, areas with high frailty will also have high levels of pre-frailty.

Figure 2: Estimated prevalence of pre-frailty among males in each Local Authority District in England, 2020

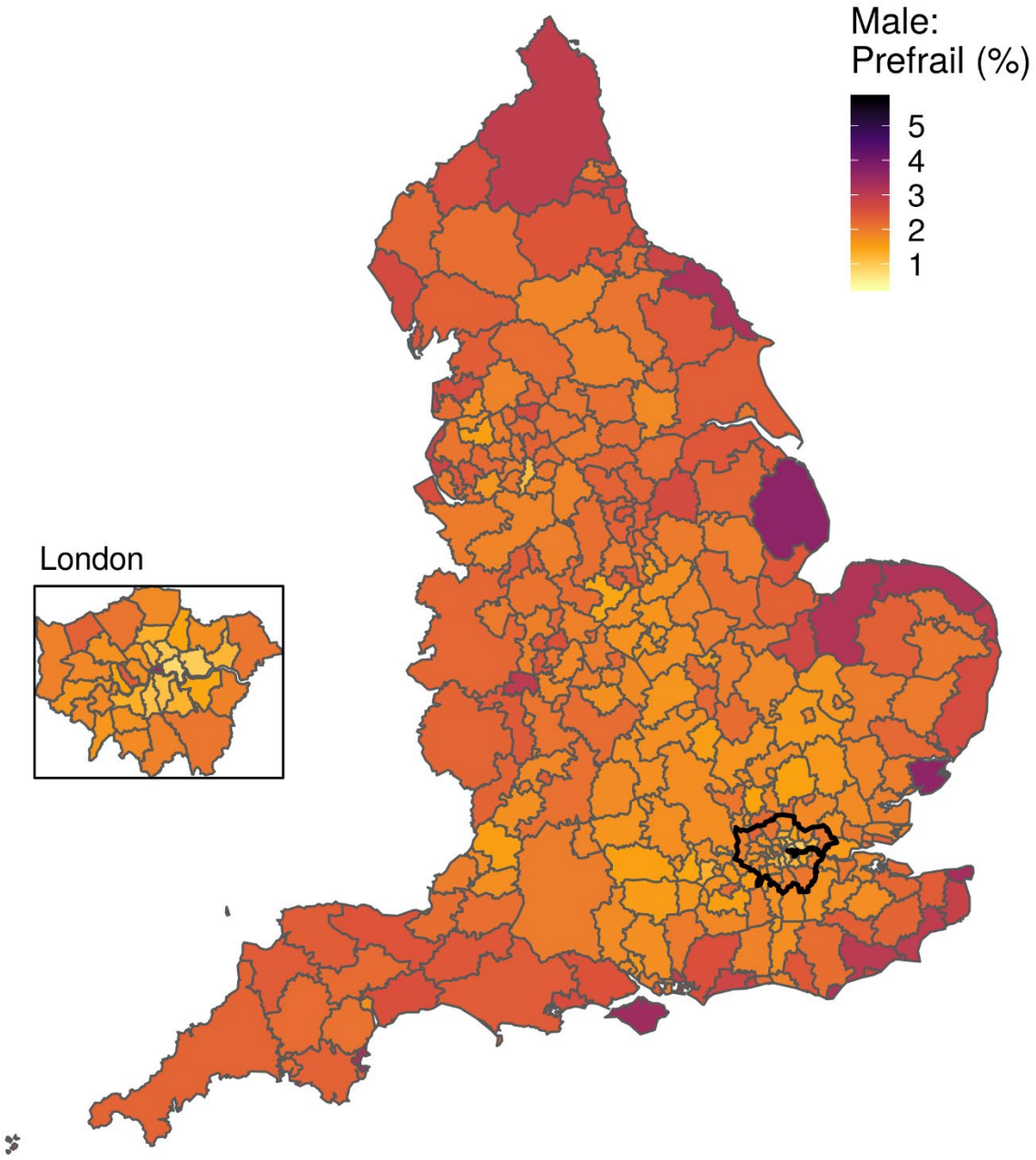


Figure 3: Estimated prevalence of pre-frailty among females in each Local Authority District in England, 2020

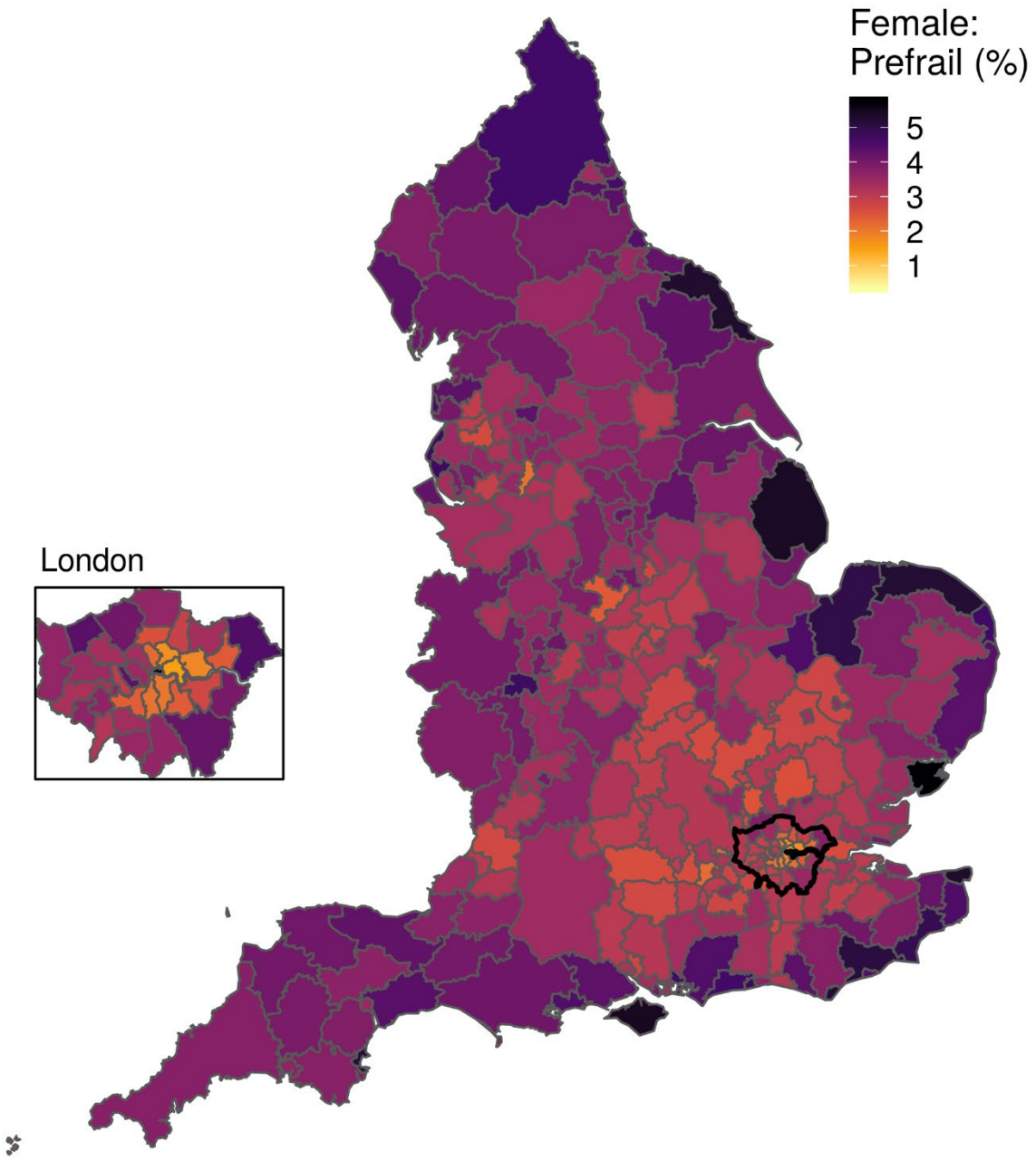


Figure 4: Estimated prevalence of frailty among males in each Local Authority District in England, 2020

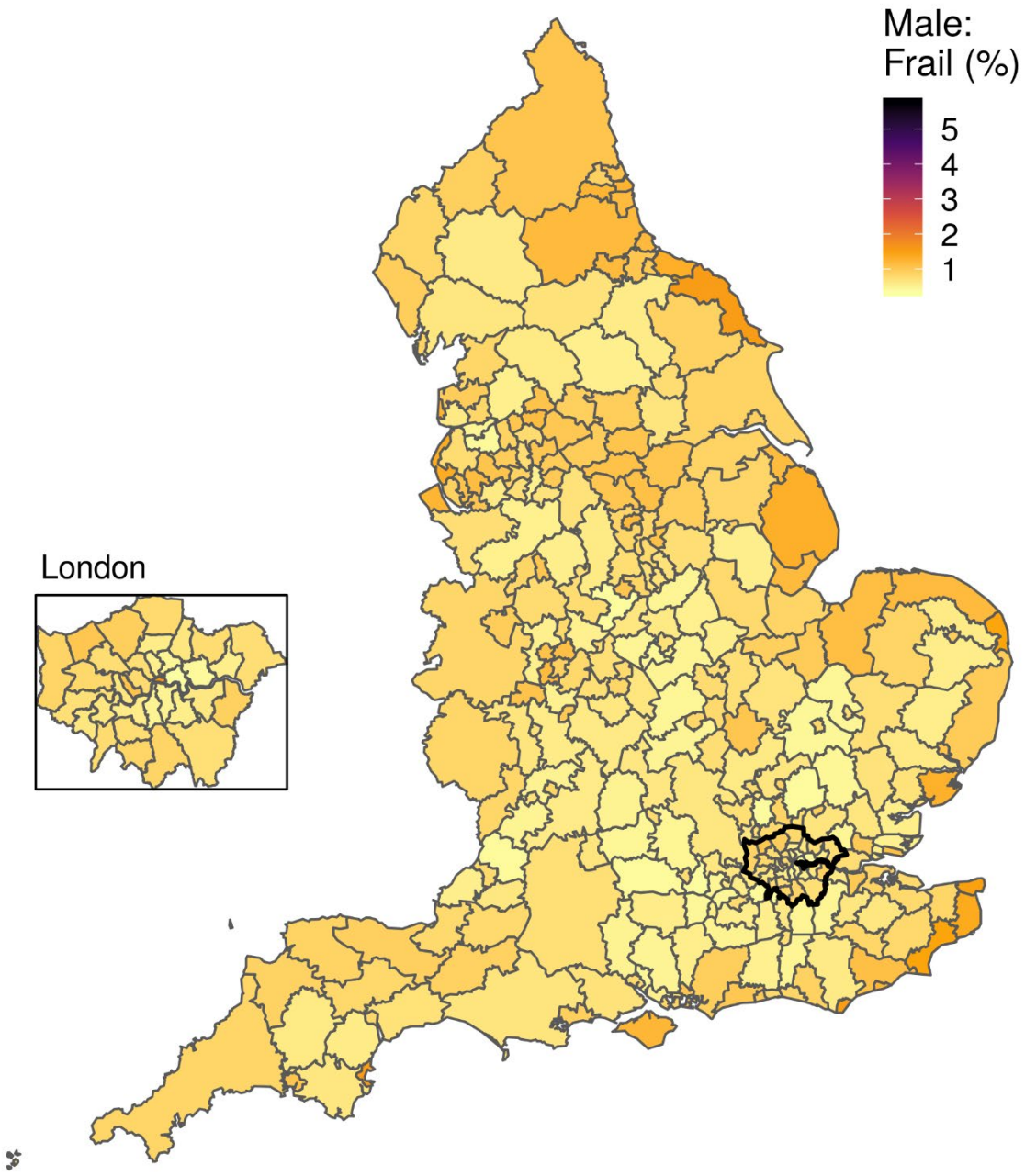
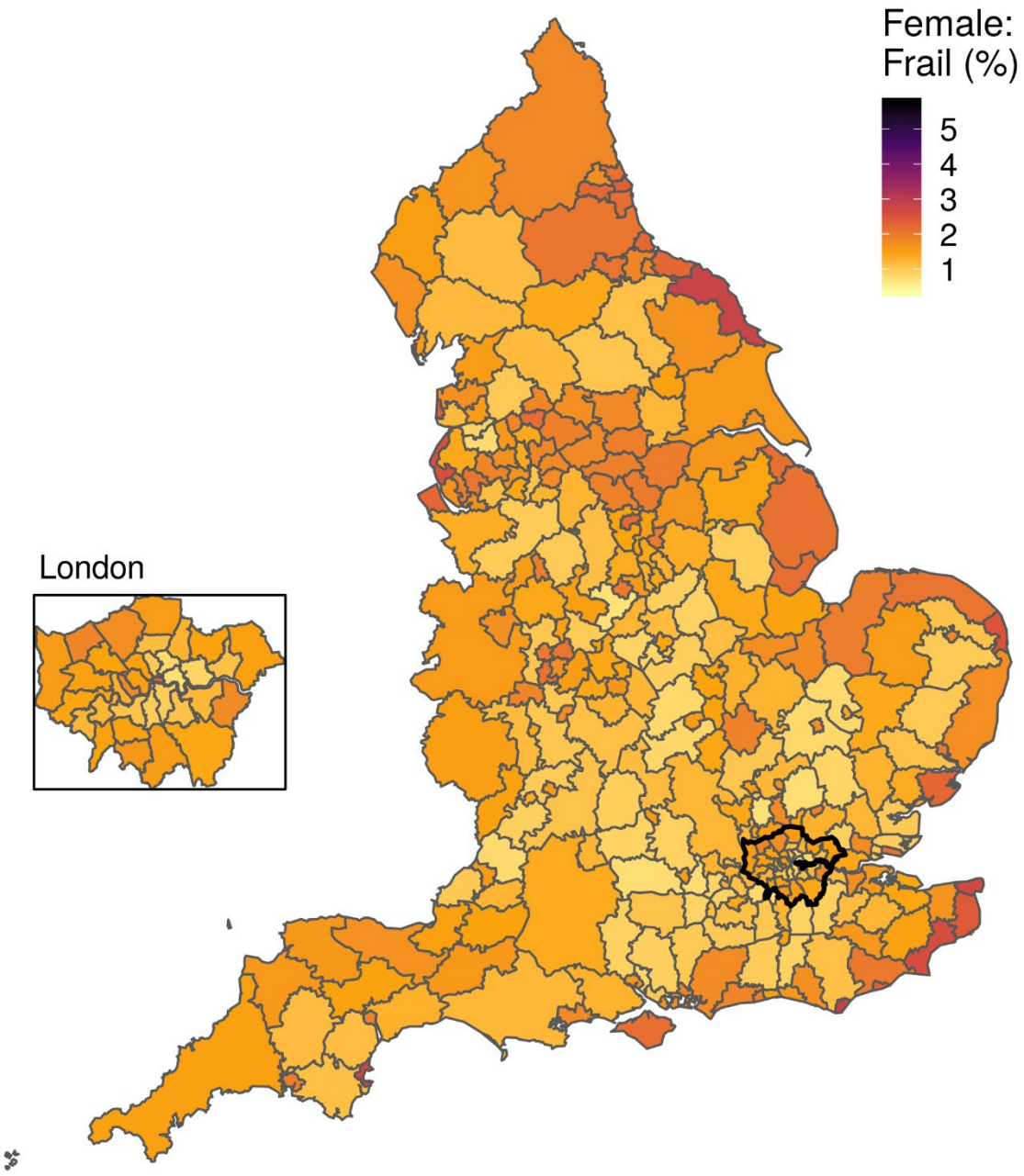


Figure 5: Estimated prevalence of frailty among females in each Local Authority District in England, 2020



Strengths and Limitations

A key strength of this study is that it provides comparable pre-frailty and frailty estimates for all LADs across England using two available large and nationally representative surveys on ageing health in England. The availability of geographically linked deprivation data in ELSA and CFAS II allows us to add socio-economic measures into the analysis. This is important because previous work has shown the importance of neighbourhood characteristics in predicting frailty among older adults in England [38].

There are several issues to consider, when interpreting the results. First, it is important to acknowledge that the prevalence of pre-frailty and frailty in this study are based on synthetic estimates that take into account local demography and social-economic context. Other factors that predict frailty, such as health behaviours, may be included in future work. Second, we note that the survey non-response rates were 44% in of CFAS II and 26% in ELSA Wave 4. Inverse probability weights were used for each survey to minimise bias in the analysis.

Comparison with other work

This report has produced estimates for the prevalence of pre-frailty and frailty among adults age 65+ years in England in 2020. It suggests that over the 2.7% of people may be pre-frail, and 1.2% frail. Our prevalence estimates are lower than figures for phenotypic frailty generated from UK Biobank data, of 3% among adults aged 37-73 [39]. This discrepancy may be due to our differences in measuring frailty and that our prevalence values are quoted as a percentage of the entire English population, not UK 37-73 year olds. Using the Electronic Frailty Index (eFI), Reeves et al. [40] reported prevalence figures for severe frailty (2.7%) and moderate frailty (10.2%), amongst people aged 65+ in England pre-frailty and frailty prevalence was higher among older people, women and people living in deprived areas. These findings were consistent with previous research from the UK [25, 38], China [16, 41], and US [13].

Conclusion

We have demonstrated substantial geographic variation in frailty and pre-frailty, with prefrailty ranging from 1.1 – 4.7% of the population in a local authority district, and frailty 0.5 – 2.2%. . The prevalence of pre-frailty and frailty in the coastal areas tend to be higher than those in inland areas. Estimates of pre-frailty should be particularly useful, to target interventions to prevent or delay the development of frailty.

Future research could describe pre-frailty and frailty prevalence using boundaries for more recently defined areas, such as Integrated Care Systems, and map areas where levels of frailty are high but receipt of care is low, to identify areas of unmet need. It would also be helpful to consider inclusion of more and different variables at the local area level, such as the degree of urbanisation.

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Additional resources

Appendix 1 Frailty index variable

Table A.1.1 Variable included in the English Longitudinal Survey of Ageing (ELSA) and Cognitive Function and Ageing Study II (CFAS II) frailty indices [27, 28]

No	Variable ELSA	Variable CFAS II
1	Difficulty walking 100 yards	
2	Difficulty sitting for 2 hours	
3	Difficulty getting up from chair after sitting long periods	
4	Difficulty climbing several flights stairs without resting	
5	Difficulty climbing one flight stairs without resting	Difficulty going up and down stairs
6	Difficulty stooping, kneeling, or crouching	
7	Difficulty reaching or extending arms above shoulder level	Difficulty reaching an overhead shelf
8	Difficulty pulling or pushing large objects	
9	Difficulty lifting or carrying weights over 10 pounds	
10	Difficulty picking up 5p coin from the table	
11	Difficulty dressing, including putting on shoes and socks	Difficulty putting on shoes and socks or stockings
12	Difficulty walking across the room	
13	Difficulty bathing or showering	Difficulty washing all over or bathing
14	Difficulty eating, such as cutting up food	
15	Difficulty getting in and out of bed	
16	Difficulty using the toilet, including getting up or down	Difficulty getting to and using the toilet
17	Difficulty using map to figure out how to get around strange	
18	Difficulty preparing a hot meal	Difficulty preparing and cooking a hot meal
19	Difficulty shopping for groceries	Difficulty shopping and carrying heavy bags
20	Difficulty making telephone calls	Difficulty using a telephone
21	Difficulty taking medications	Difficulty taking medicine
22	Difficulty managing money, such as paying bills and keeping tracks of expenses	Difficulty managing money (paying bills/writing cheques or using an ATM to remove or deposit money)
23	Difficulty doing work around the house or garden	Difficulty doing the heavy housework

24	Self-reported general health	Self-reported general health
25	Hypertension	High blood pressure
26	Angina	Angina
27	Heart attack	Heart attack
28	Congestive heart failure	
29	Abnormal heart rhythm	
30	Diabetes/high blood sugar	Sugar Diabetes
31	Stroke	Stroke
32	Lung diseases	Chronic Bronchitis
33	Asthma	Asthma
34	Arthritis	Arthritis
35	Osteoporosis	
36	Cancer	Cancer
37	Parkinson diseases	Parkinson's Disease
38	Psychiatric conditions	
39	Alzheimer diseases	
40	Dementia	Dementia
41	Poor or fair self-reported eyesight	Poor eyesight which interferes with day-to-day living
42	Poor or fair self-reported hearing	Hearing problems which interfere with day-to-day living
43	Fallen down	
44	Fractured hip	
45	Had joint replacement	
46	Cannot answer correct day of month	
47	Cannot answer correct month	Cannot answer correct month
48	Cannot answer correct year	Cannot answer correct year
49	Cannot answer correct day	
50	Immediate recall	
51	Delayed recall	
52		Difficulty doing the light housework
53		Intermittent Claudication
54		Serious Head Injury or been unconscious after it
55		Fits or Epilepsy
56		Meningitis or encephalitis (brain fever)
57		Difficulty getting on a bus
58		Difficulty cutting your own toenails
59		Difficulty tying a good knot in a piece of string
60		Transient ischaemic attack
61		Low blood pressure
62		Regular headaches
63		Difficulty following TV programmes or movies and remembering details of the stories
64		MMSE score <24

Appendix 2 Frailty index determinants

Table A.2.1 Individual level predictors of frailty index

Variable	Definition	Code	Type
Age	The age of the respondent in the year of the survey	65-69, 70-74, 75-79, 80-84, 85-89, 90+	Categorical
Gender	The gender of the respondent	1=male 2=female	Nominal/binary
Deprivation Index	Townsend deprivation index in quintile	1-5	Categorical

Table A.2.2 Local authority district level variables

Variable	Definition	Source	Year
Age	The age of the respondent in the year of the survey	Population projections for local authorities	2020
Gender	The gender of the respondent	Population projections for local authorities	2020
Deprivation Index	Townsend deprivation index in quintile	UK Townsend Deprivation Scores	2011

Appendix 3 Estimates of pre-frailty and frailty prevalence among adults aged 65+: LADs

Local Authority District	Prefrail (%)	Frail (%)
Adur	3.0	1.1
Allerdale	3.1	1.2
Amber Valley	2.7	1.1
Arun	3.8	1.5
Ashfield	2.9	1.1
Ashford	3.1	1.2
Babergh	3.0	0.9
Barking and Dagenham	1.7	0.8
Barnet	2.8	1.3
Barnsley	3.0	1.5
Barrow-in-Furness	3.3	1.2
Basildon	2.7	1.4
Basingstoke and Deane	2.1	0.8
Bassetlaw	3.4	1.3
Bath and North East Somerset	2.5	1.0
Bedford	2.9	1.5
Bexley	2.6	1.4
Birmingham	2.4	1.2
Blaby	2.3	0.7
Blackburn with Darwen	2.6	1.2
Blackpool	3.8	1.8
Bolsover	3.1	1.2
Bolton	2.6	1.3

Local Authority District	Prefrail (%)	Frail (%)
Boston	3.3	1.7
Bournemouth, Christchurch and Poole	3.6	1.4
Bracknell Forest	1.8	0.7
Bradford	2.8	1.3
Braintree	2.5	1.0
Breckland	3.1	1.2
Brent	2.3	1.1
Brentwood	2.4	0.7
Brighton and Hove	2.5	1.2
Bristol, City of	2.4	1.2
Broadland	2.9	0.9
Bromley	2.8	1.1
Bromsgrove	2.7	0.8
Broxbourne	2.9	1.1
Broxtowe	2.6	1.0
Burnley	3.5	1.7
Bury	2.8	1.1
Calderdale	2.9	1.5
Cambridge	2.6	1.3
Camden	2.3	1.1
Cannock Chase	3.1	1.2
Canterbury	3.3	1.3
Carlisle	3.4	1.3
Castle Point	2.8	0.8
Central Bedfordshire	2.2	0.8
Charnwood	2.3	0.9

Local Authority District	Prefrail (%)	Frail (%)
Chelmsford	2.4	0.9
Cheltenham	3.2	1.2
Cherwell	2.3	0.9
Cheshire East	2.6	0.8
Cheshire West and Chester	2.7	1.0
Chesterfield	3.3	1.7
Chichester	3.5	1.4
Chorley	2.1	0.6
City of London, Westminster	4.0	1.9
Colchester	2.7	1.0
Copeland	3.5	1.3
Corby	2.1	1.1
Cornwall	3.1	1.2
Cotswold	2.9	0.8
County Durham	3.2	1.6
Coventry	2.5	1.2
Craven	3.1	0.9
Crawley	2.1	1.1
Croydon	2.5	1.2
Dacorum	2.8	1.1
Darlington	3.2	1.6
Dartford	2.3	0.9
Daventry	2.2	0.6
Derby	3.1	1.5
Derbyshire Dales	3.0	0.9
Doncaster	3.0	1.5
Dorset	3.3	0.9

Local Authority District	Prefrail (%)	Frail (%)
Dover	3.7	1.9
Dudley	3.2	1.6
Ealing	2.4	1.2
East Cambridgeshire	2.2	0.6
East Devon	3.5	1.0
East Hampshire	2.7	0.8
East Hertfordshire	2.0	0.6
East Lindsey	4.6	1.7
East Northamptonshire	2.6	1.0
East Riding of Yorkshire	3.2	1.2
East Staffordshire	3.0	1.1
East Suffolk	3.5	1.4
Eastbourne	4.2	2.2
Eastleigh	2.2	0.6
Eden	3.1	0.9
Elmbridge	2.2	0.6
Enfield	2.5	1.2
Epping Forest	2.5	1.0
Epsom and Ewell	2.1	0.6
Erewash	3.2	1.2
Exeter	2.6	1.4
Fareham	2.7	0.8
Fenland	3.6	1.4
Forest of Dean	3.0	1.2
Fylde	3.1	0.9
Gateshead	3.6	1.7

Local Authority District	Prefrail (%)	Frail (%)
Gedling	2.6	1.0
Gloucester	2.6	1.0
Gosport	3.2	1.2
Gravesham	2.7	1.4
Great Yarmouth	3.8	2.0
Greenwich	1.9	0.9
Guildford	2.1	0.8
Hackney	1.3	0.6
Halton	2.7	1.4
Hambleton	2.9	0.8
Hammersmith and Fulham	2.0	1.0
Harborough	2.5	0.7
Haringey	1.8	0.8
Harlow	3.0	1.4
Harrogate	2.8	0.8
Harrow	3.0	1.4
Hart	2.3	0.7
Hartlepool	3.6	1.7
Hastings	3.6	1.8
Havant	3.9	1.5
Havering	2.9	1.1
Herefordshire, County of	3.1	1.2
Hertsmere	3.1	1.2
High Peak	2.5	1.0
Hillingdon	2.5	1.2
Hinckley and Bosworth	2.3	0.7

Local Authority District	Prefrail (%)	Frail (%)
Horsham	2.6	0.8
Hounslow	2.2	1.1
Huntingdonshire	2.5	1.0
Hyndburn	2.9	1.5
Ipswich	3.1	1.5
Isle of Wight	4.5	1.7
Isles of Scilly	2.7	1.0
Islington	1.6	0.8
Kensington and Chelsea	3.0	1.4
Kettering	2.9	1.1
King's Lynn and West Norfolk	4.1	1.6
Kingston upon Hull, City of	2.7	1.3
Kingston upon Thames	2.2	1.1
Kirklees	2.7	1.4
Knowsley	3.2	1.5
Lambeth	1.5	0.7
Lancaster	3.2	1.2
Leeds	2.9	1.4
Leicester	2.2	1.1
Lewes	3.4	1.3
Lewisham	1.7	0.8
Lichfield	2.6	0.8
Lincoln	2.9	1.4
Liverpool	2.7	1.3
Luton	2.3	1.1
Maidstone	2.4	0.9

Local Authority District	Prefrail (%)	Frail (%)
Maldon	2.7	0.8
Malvern Hills	3.2	0.9
Manchester	1.7	0.8
Mansfield	3.0	1.5
Medway	2.4	1.2
Melton	2.5	0.7
Mendip	2.9	1.1
Merton	2.3	1.1
Mid Devon	3.0	1.1
Mid Suffolk	2.7	0.8
Mid Sussex	2.4	0.7
Middlesbrough	3.0	1.4
Milton Keynes	2.1	1.1
Mole Valley	2.7	0.8
New Forest	3.5	1.0
Newark and Sherwood	2.7	1.0
Newcastle upon Tyne	2.7	1.3
Newcastle-under-Lyme	3.2	1.2
Newham	1.3	0.6
North Devon	3.2	1.3
North East Derbyshire	3.0	1.2
North East Lincolnshire	3.2	1.7
North Hertfordshire	2.4	0.9
North Kesteven	2.6	0.8

Local Authority District	Prefrail (%)	Frail (%)
North Lincolnshire	3.3	1.3
North Norfolk	4.2	1.6
North Somerset	2.7	0.8
North Tyneside	3.2	1.6
North Warwickshire	2.8	1.1
North West Leicestershire	2.4	0.9
Northampton	2.3	1.2
Northumberland	3.8	1.5
Norwich	2.8	1.4
Nottingham	2.2	1.0
Nuneaton and Bedworth	3.0	1.1
Oadby and Wigston	2.7	0.8
Oldham	2.9	1.4
Oxford	2.4	1.2
Pendle	2.9	1.5
Peterborough	2.7	1.3
Plymouth	2.9	1.5
Portsmouth	2.6	1.3
Preston	2.3	1.2
Reading	2.3	1.1
Redbridge	2.3	1.1
Redcar and Cleveland	3.5	1.8
Redditch	2.7	1.4
Reigate and Banstead	2.4	0.9

Local Authority District	Prefrail (%)	Frail (%)
Ribble Valley	2.7	0.8
Richmond upon Thames	2.5	0.9
Richmondshire	2.6	1.0
Rochdale	3.0	1.4
Rochford	2.6	0.7
Rossendale	2.9	1.1
Rother	4.1	1.6
Rotherham	3.1	1.6
Rugby	2.5	0.9
Runnymede	2.2	0.8
Rushcliffe	2.4	0.7
Rushmoor	2.3	0.9
Rutland	2.9	0.8
Ryedale	3.4	1.3
Salford	2.6	1.3
Sandwell	2.8	1.3
Scarborough	4.3	2.2
Sedgemoor	3.0	1.1
Sefton	3.8	2.0
Selby	2.5	0.9
Sevenoaks	2.4	0.7
Sheffield	3.1	1.5
Shepway	3.9	2.0
Shropshire	3.1	1.2
Slough	1.8	0.9
Solihull	2.8	1.1
Somerset West and Taunton	3.4	1.3

Local Authority District	Prefrail (%)	Frail (%)
South Cambridgeshire	2.2	0.6
South Derbyshire	1.9	0.6
South Gloucestershire	2.1	0.6
South Hams	3.1	0.9
South Holland	3.0	1.2
South Kesteven	2.9	1.1
South Lakeland	3.2	0.9
South Norfolk	2.7	0.8
South Northamptonshire	2.3	0.7
South Oxfordshire	2.4	0.7
South Ribble	2.4	0.7
South Somerset	3.2	1.3
South Staffordshire	2.7	0.8
South Tyneside	3.8	1.8
Southampton	2.5	1.2
Southend-on-Sea	3.2	1.6
Southwark	1.5	0.7
Spelthorne	2.4	0.9
St Albans	2.0	0.6
St. Helens	3.2	1.6
Stafford	2.8	1.1
Staffordshire Moorlands	2.7	0.8
Stevenage	2.5	1.3
Stockport	2.5	1.0
Stockton-on-Tees	2.8	1.4

Local Authority District	Prefrail (%)	Frail (%)
Stoke-on-Trent	3.1	1.5
Stratford-on-Avon	3.0	0.9
Stroud	2.4	0.7
Sunderland	3.5	1.7
Surrey Heath	2.4	0.7
Sutton	2.4	1.2
Swale	2.9	1.1
Swindon	2.5	1.0
Tameside	2.7	1.4
Tamworth	2.9	1.1
Tandridge	2.4	0.7
Teignbridge	3.0	0.9
Telford and Wrekin	2.6	1.3
Tendring	4.7	1.8
Test Valley	2.4	0.7
Tewkesbury	2.6	0.8
Thanet	4.4	2.1
Three Rivers	2.4	0.9
Thurrock	2.1	1.1
Tonbridge and Malling	2.4	0.9
Torbay	4.2	2.2
Torridge	3.2	1.3
Tower Hamlets	1.1	0.5
Trafford	2.8	1.1
Tunbridge Wells	3.2	1.2
Uttlesford	2.3	0.7
Vale of White Horse	2.3	0.7

Local Authority District	Prefrail (%)	Frail (%)
Wakefield	3.0	1.5
Walsall	3.3	1.6
Waltham Forest	2.0	1.0
Wandsworth	1.7	0.8
Warrington	2.3	0.9
Warwick	2.5	0.9
Watford	2.1	1.1
Waverley	2.6	0.8
Wealden	3.0	0.9
Wellingborough	3.0	1.1
Welwyn Hatfield	2.6	1.3
West Berkshire	2.1	0.6
West Devon	3.1	0.9
West Lancashire	2.8	1.1
West Lindsey	2.9	1.1
West Oxfordshire	2.5	0.7
West Suffolk	2.7	1.1
Wigan	2.9	1.5
Wiltshire	2.7	1.1
Winchester	2.4	0.7
Windsor and Maidenhead	2.5	1.0
Wirral	3.4	1.8
Woking	2.8	1.1
Wokingham	2.0	0.6
Wolverhampton	3.2	1.5
Worcester	2.7	1.0
Worthing	3.9	1.5
Wychavon	2.8	0.8

Local Authority District	Prefrail (%)	Frail (%)
Wyre	3.5	1.3
Wyre Forest	3.9	1.5
York	3.0	1.1
Buckinghamshire	2.4	0.9
Westminster	2.3	1.1

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