NIHR | Policy Research Unit
Adult social care

Identifying Typologies of Care Needs Among Older Social Care Users in England: A Latent Class Analysis Using Administrative Data

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April 2026

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This NIHR Policy Research Unit in Adult Social Care (ASCRU) is part of the National Institute for Health and Care Research (NIHR) and hosted by the London School of Economics and Political Science in collaboration with the University of Kent and supported by King’s College London.

This study is independent research commissioned and funded by the NIHR ASCRU (reference NIHR206126). The views expressed are those of the authors and not necessarily those of the NIHR, the Department of Health and Social Care (DHSC) or its arm’s length bodies, and other Government Departments.

Executive summary

Background

Targeting adult social care fairly and efficiently requires a clear view of who needs support, what support they receive, and how needs change over time. Survey data often lack sufficient numbers of publicly supported users and can exclude people with cognitive impairment, which limits their usefulness for detailed planning. Routine assessment records held by English local authorities, when linked to service use, can fill this gap by providing large scale, granular information on need profiles, service mix and trajectories at low marginal cost. This study uses such administrative data to identify typologies of older community based service users, to relate those typologies to patterns of provision and costs, and to examine deterioration and improvement over time.

Data

We analysed anonymised administrative records from two relatively affluent shire authorities in England, covering older people aged 65 and over who received publicly funded community support between 2012 and 2015. The combined sample comprised roughly 13,500 users and 32,944 assessments, forming unbalanced panels, weekly in Local Authority 1, LA1, and monthly in Local Authority 2, LA2. On average, users had 2.3 assessments in LA1, range 1 to 16, and 1.5 in LA2, range 1 to 8. Assessment content covered ADLs and IADLs, cognition, safety, mobility, mood, health conditions including dementia and stroke, primary support reason, unpaid care, and in LA2 whether the person lived alone. Linked service data captured components such as home care, short term support, day care, telecare, direct payments, meals, monthly community costs, and whether the user died while in community care.

Methods

We conducted separate latent class analyses, LCA, in each authority using all available need indicators, treating ordered items appropriately. Model selection considered interpretability alongside BIC, entropy and the Vuong Lo Mendell Rubin test. We chose a four class solution for both areas because it yielded clear, policy relevant profiles. In a second stage we examined how class membership related to service configurations and outcomes and to change in dependency. To analyse change we standardised each IADL and ADL item across areas, and created an overall dependency score. Repeated assessments were clustered by person to account for within person correlation.

Results

Four coherent and comparable classes emerged. Class 1, low need, about 6 to 8 per cent of assessments, contained users with relatively low dependency who were more likely to live alone, had fewer reassessments and received short term support more often. Class 2, moderate need with safety and mobility issues, 20 to 23 per cent, was frequently associated with sensory impairment or physical disability and in LA2 had the highest receipt of meals services, 25 per cent. Class 3, moderate need with cognitive difficulties, 33 to 46 per cent, included many users with dementia and typically received home care. Class 4, high need across most domains, 29 to 39 per cent, had the most intensive packages, the highest monthly community costs, about £306 to £355, the highest prevalence of unpaid carers, and the highest mortality. Overall class shares were broadly similar across councils, although Class 3 was more prevalent in LA2, 46 per cent versus 33 per cent in LA1.

Longitudinally, deterioration and improvement rates were consistent overall across councils and with patterns seen among older social care users in external surveys. After 24 months, roughly 40 per cent of community users had higher needs while about 10 per cent improved. In LA1 there was a discrete rise in recorded improvement shortly after twelve months from first assessment, consistent with recovery being recognised at scheduled review rather than when change occurred. By class, trajectories differed: in LA1 the low need class deteriorated more quickly and showed little improvement compared with LA2, coinciding with LA1's more frequent reassessment cycle, 2.9 versus 1.7 assessments on average. Within each council, reassessment intervals were quite similar across classes, suggesting that scheduling may reflect local policy rather than user risk.

Implications

The findings have important operational and system wide implications. First, they suggest that structured assessment data can be used to construct simple, communicable need profiles that predict service mix, costs and outcomes. Embedding typologies or risk segmentation within local case management systems could help teams match care needs to resources and likely outcomes. For example, reablement and other restorative interventions could be prioritised for low and mid need classes where improvement is observed, with explicit step down criteria, while high need users receive stable, adequately resourced packages with carer support checks and continuity as priorities.

Second, assessment and review timings should reflect a risk stratification. Assessment scores and class membership can set default intervals, shorter where improvement is plausible and longer where change is rare, with safety nets for rapid decline. Objective triggers should pull reviews forward, such as a fall, emergency department attendance or carer breakdown, and sustained improvement should trigger reductions in support. This approach would help reduce avoidable contact and burden for stable users, focus assessor time where it adds value, and bring forward decisions that can reduce cost without compromising safety or outcomes.

Third, the analysis demonstrates the value of including a standardised assessment core within England's Social Care Client Level Data. A nationally agreed item set that covers key domains, ADLs, IADLs, cognition, safety, mobility, mood, communication and carer context, recorded on common scales with metadata for assessment type, date, reason for review and form version, would allow robust comparison across councils, reliable tracking of improvement and deterioration, and fairer benchmarking of package intensity and outcomes once linked to service components, hours and costs and, through data linkage, to hospital use, care home admission and mortality. Needs-related, structured data from assessments in CLD could turn routine records into a planning tool that improves equity, efficiency and user experience.

Finally, none of this implies automation of eligibility decisions. The results show that routine data, interpreted through professional judgement, can strengthen the link from assessed need to activity, expenditure and outcomes. Replication across a more diverse set of councils, testing measurement invariance and transitions between classes, would strengthen generalisability of the results and support adoption of similar analytical approaches at scale.

Background

Understanding whether social care resources are targeted fairly and efficiently depends on a detailed knowledge of the characteristics of those requiring support. However, assessing the need for social care support is a complex process characterised by inherent multidimensionality. The social care evaluation literature has highlighted key dimensions of need, including physical dependency, usually measured by problems undertaking Activities of Daily Living (ADLs) and Instrumental Activities of Daily Living (IADLs), physical and mental health status, availability of unpaid care, and environmental issues (Davies and Fernandez, 2000; Glendinning *et al.*, 2008; and Henderson *et al.,* 2014). Additionally, the social care service ethos strongly emphasises tailoring support to individual preferences. This complicates assessing the targeting of social care services, as it often leads to differences in support packages between service users with similar needs but different care preferences.

Evidence on care needs among older people in England is limited. Secondary data sources such as the English Longitudinal Study of Ageing (ELSA) and the UK Household Longitudinal Study (UKHLS) do not contain sufficiently large samples of older people with care needs likely to be eligible for publicly supported social care packages to enable detailed quantitative analyses of care needs and service targeting, in particular when these involve subgroup analyses combining several need dimensions. The scarcity of longitudinal data, small sample sizes, the reliance on self-reported data, and the exclusion of those without the mental capacity to consent has thus undermined research around one of the groups in society with the greatest need for support (see for instance Gordon et al., 2014 and Green *et al.,* 2017).

The lack of routine, publicly available data on the characteristics of social care service users emphasises the need to explore alternative sources of evidence. This study explores the potential to use evidence from assessment records from two Local Authorities (LAs) in England to identify typologies of service recipients and investigate whether, and how, these typologies are associated with patterns of service use and changes in care needs through time. Our aim is to identify underlying subgroups with similar profiles, i.e., naturally occurring combinations of variables at the level of the individual (Bergman & Trost, 2006), that require different types of support and/or might face different risks of deterioration over time.

Data

The analysis is based on social care administrative records from two Local Authorities in England. Although the detailed definitions of the indicators collected in the two areas vary, they both cover information on demographic characteristics (age, gender and ethnicity), care needs (problems with seated transfer, toileting, preparing meals, washing, dressing making decisions, personal care, travelling independently, mobility, going out and about, staying safe, shopping, planning, housework, memory and orientation, social interactions), health conditions (dementia, chronic obstructive pulmonary disorder, cancer, acquired physical injury, stroke, acquired brain injury, neurological, mental health), disability (e.g. sensory impairment), unpaid care support, and social care service provision (cost and type of package received). Data from all assessments and reassessments carried out by local authority care managers and information about service use from the local financial systems were matched and shaped into longitudinal, individual-level panel datasets, weekly for Local Authority 1 (LA_1) and monthly for Local Authority 2 (LA_2).

The number and frequency of needs assessments and reviews varied across services users. Although this is not always achieved, local authorities in England aim to review the care needs of social care users at least once a year. However, additional reassessment can be triggered if authorities are alerted by the individual, their family or the care providers of a significant change in their circumstances. In the analyses, we assume that the care needs of service users remain unchanged between reassessments.

The two local authorities in the study are Shire councils located in the South West and East of England regions. Both local authorities are relatively affluent and appear in the first quartile of the distribution of local authority age-standardized mortality distribution in England, and in the bottom quartile of the Index of Multiple Deprivation (ONS, 2018). They show a higher proportion of population aged above 85 compared to most of local authorities in England (ONS 2020).

The information about care needs and service use was anonymised prior to sharing it with the research team so users could not be identified at any point during the analysis. A total of 13,500 older (65+) receiving care packages in the community were included in the study. The analysis data covered the period 2012 to 2015 for both authorities. Following discussions with local care professionals about the way they collect information, we made the assumption that the lack of completion of items from the need assessment forms indicated that the item in question was not seen as relevant to the case by the care manager. This affected 15% of care needs items in LA_1, which were therefore replaced with `no care need' identified. The analyses excluded a small number of cases due to other missing information (0.07%% in LA_1 and 0.75% in LA_2). Repeated observations for each service user were pooled together, creating an unbalanced panel with multiple observations for service users with more than one assessment in the period observed. A total of 24,867 assessments from 9,388 older users were available in LA_1 and 8,077 assessments from 5,485 older users were available for analysis in LA_2. There were on average 2.3 repeated assessments per individual in LA_1 (range 1 to 16), and 1.5 in LA_2 (range 1 to 8) over the period of the analysis in each Local Authority.

Needs assessment information

Although both local authorities covered similar areas of care needs in their assessment forms, they used different questions to measure them. This meant that the analysis had to be carried out separately for each authority. In LA_1, most of indicators of ADL/IADL needs focused on the need for support with specific tasks and were measured using binary (yes/no) answers. Some needs (i.e. practical needs support, preparing meals, and going out and about) were recorded using scales varying from 0 to 4. The indicators of ADL/IADL needs in LA_2 ranged from 0 to 5, corresponding to full independence and very high levels of support needs, respectively. Feel safe indicator, however, ranged from 0 (feeling safe) and 32 (feeling unsafe). Appendices A and B provide more details about the assessment forms in the two areas. The main reason for support (e.g., types of disability, mental health or social support), and health conditions were available in both local authorities, as were indicators of dementia, stroke, age, gender and receipt of unpaid care.

Use of social care services

We identified those care recipients who were in community following their care needs assessment. We used information on use and costs of social care services in the community. There were some differences in the classification of services in the two local authorities, as illustrated in Table 2.

Methods

Latent class analysis (LCA)

We used Latent Class Analysis (LCA) using the Mplus 8.0 software (Muthén & Muthén, 1998-2017) to investigate underlying patterns and combinations of needs in the two authorities separately. We used all needs variables available in each dataset to build the latent classes. Variables with up to five categories (in LA_2) were treated as ordered categorical. When more than five categories were available, the indicators were treated as continuous. We explored models with up to 5 latent classes to identify the most parsimonious model, assessing the interpretability of the classes and statistically comparing the Bayesian Information Criterion (BIC), Vuong-Lo-Mendell-Rubin Likelihood Ratio Test (VLMR-LRT), and entropy value between the nested models, as provided in Mplus (Asparouhov & Muthén, 2014). A lower BIC values indicates a better fit, whereas an entropy value closer to 1 indicates a clearer delineation of classes. The likelihood ratio test (VLMR-LRT) was used to compare the nested models. A significant *p*-value indicates that the added class improves statistically significantly the fit of the model. Maximum likelihood methods with robust standard errors were used.

Patterns of care and changes in needs through time

In a second stage, we used class membership to examine how classes related to patterns of support and to changes in needs over time. We did so to assess whether the classes represented meaningful groups of service users in terms of their risk of deterioration and services received.

Changes in needs through time were assessed in terms of changes across assessments in the total number of Activities of Daily Living (ADLs) and Instrumental Activities of Daily Living (IADLs). To do so, the I/ADLs indicators were standardised to ensure that I/ADL questions in the two authorities had the same range: 0 when no needs or very little support was needed with regards to each need, and 1 when users required support. The indicators thus constructed were aggregated to construct an overall dependency score.

To account for within person correlation across repeated measurements, we treated each individual's assessments as a cluster in the statistical analysis. This analysis was carried using the statistical software Stata.

Results

Descriptive results

Table 1 shows that in both local authorities, approximately 60% of users were female and more than three-quarters were aged above 75 years of age. Dementia and acquired brain injury were the most frequent health conditions noted in the assessments in LA_2. Table 1 also shows a considerable difference between the proportions of people receiving unpaid care across the two councils. This may be explained by the wording of the question used to identify unpaid care support. In particular, the indicator in LA_2 was constructed from several questions about the receipt of help from families or friends with different tasks, whereas in LA_1 the assessment was based on an overall question about the presence of an unpaid carer. LA_2 collected information on whether the care recipient lived alone, whereas this indicator was not recorded in LA_1. Table 2 shows that most users received home care. The monthly community care cost varied between £240 and £204 in LA_1 and LA_2 respectively (£ in 2022 prices), and about a fifth of the care recipients died during the service use period.

The distributions of needs in LA_1 and $LA_{2,}$ overall and for each of the classes identified in the analysis are reported in Tables 3 and 4. The most frequent care needs related to travelling independently, personal care, and staying safe. LA_2 showed a similar pattern: needs related to feeling safe, housework, household shopping, getting out, and preparing meals were the most common.

Needs typologies

The underlying patterns and combinations of needs among service users were investigated using Latent Class Analysis. The comparison of the statistical models suggested that up to five classes could be constructed in both LA_1 and LA_2: the VLMR-LRT comparison suggested the 5-class solution provided a better fit compared to the 4-class solution (see supplementary Table 5). In LA_2, adding more classes did not improve the entropy of the model. However, the interpretation of the results of the models with five classes was difficult in both LAs. Therefore, we used four classes to summarise the patterns of needs in the two LAs.

The need profiles in the four classes are described in Table 3 for LA_1 and Table 4 for LA_2. The profiles of the other background characteristics used in the models are shown in Supplementary Tables 6 and 7 for LA_1 and LA_2, respectively. Patterns of service use in the four classes is described in Supplementary Table 8.

In both councils, Class 1 captured users with low levels of need, most of whom received short-term support. Class 4 comprised users with very high needs across most dimensions, who received the most expensive packages and had higher mortality during the study period. Classes 2 and 3 had moderate needs but differed in profile, Class 2 centred on safety and mobility issues, often linked to sensory impairment or physical disability, while Class 3 was mainly defined by cognitive difficulties, for example decision making, alongside feeling safe. Across the two councils the distribution of classes was broadly similar, although Class 3 was more prevalent in LA2, with the share of users in LA1 versus LA2 as follows, Class 1, 6 per cent versus 8 per cent, Class 2, 23 per cent versus 20 per cent, Class 3, 33 per cent versus 46 per cent, and Class 4, 39 per cent versus 29 per cent.

Users in Class 1 were generally younger, more independent, more likely to live alone, less likely to have an unpaid carer, and were assessed less often. Their average monthly community package cost was lower, £126 in LA1 and £105 in LA2, and a smaller share died during follow-up (15 per cent). Class 2 users' mobility-related needs were frequently associated with sensory impairment or physical disability, and in LA2 this group contained the highest proportion receiving meals services, at 25 per cent. Many Class 3 users had dementia and typically received home care. Class 4 had the highest proportion with an unpaid carer and the lowest proportion living alone, the highest monthly community care costs, and the highest mortality during the analysis period.

Patterns of care and changes in needs

We found that, overall, patterns of deterioration were not only very similar across the two local authorities, but also when compared against the sample of older people in the English Longitudinal Survey of Ageing (ELSA) in receipt of social care support. This suggests that in spite of the unevenness in patterns of reassessment, administrative records can provide a useful assessment of the changes in care needs for older social care recipients.

Figure 1 shows that after two years (24 months) of assessment, around 40% of community users experienced an increase in their care needs while only 10% experienced an improvement in LA_1 and LA_2. Particularly interesting is the case of LA_1 where a jump in the proportion of users that experience an improvement (that is, that see a decrease in the support required) is seen just after twelve months of their first assessment. This could potentially indicate that the positive changes in care needs for some users were only identifies when service users were formally reassessed. This finding could support more frequent reassessments for users more likely to improve. We also found that male social care users in LA_1 deteriorated more quickly than female users and, as expected, those aged 85 years old or above deteriorated faster than younger individuals. Similarly, physically disabled individuals deteriorated at a faster rate than the overall population of social care users (see more details in Appendix C).

We also explored whether patters of improvement and deterioration varied across the classes identified. Figure 2 shows significant differences in the need trajectories of the lowest dependency classes identified in LA_1 and LA_2 (Class 1). In LA_1 the deterioration rate of Class 1 is much higher than in LA_2, and the improvement rate is almost zero. This may be related to the greater room for deterioration experienced by users with relatively lower levels, but also to the much greater frequency of assessments in LA_1, almost twice the rate in LA_2 (2.9 and 1.7 assessments during the period of analysis, respectively).

Interestingly, the average reassessment time was broadly similar across classes within each local authority, even if the reassessment frequency across the two councils were very different. This finding is important because it appears to highlight significant disparities in local assessment and resource allocation policies. A mismatch between the need for additional (or less) support and the timing at which assessments are performed could have implications not only for the wellbeing and independence of social care users, but it could also prevent the social care system from working more efficiently and to find an optimal schedule of assessments for different types of social care users. Even if assessments and reassessments require resources, local authorities could benefit from implementing more frequent assessments to identify users that have improved and do not require as much support. Such decisions should also consider the potential burden on users, since overly frequent scrutiny of their support needs may lead to unnecessary stress.

Discussion

Local authorities conduct very large numbers of needs assessments, yet there is limited published evidence on the profiles these assessments reveal and how those profiles relate to service use and outcomes. Routinely collected assessment records linked to service data, could help close this gap. Used well, they show patterns of need and subsequent trajectories at scale, at low marginal cost, and with a level of granularity that surveys rarely achieve. Our analysis demonstrates that these data can support coherent typologies of older service users, show how those typologies line up with service mix and cost, and track deterioration and improvement over time. This evidence could support commissioners and care managers with evidence to help strengthen and improve the link between assessed need, activity, expenditure and outcomes.

The meaning of the typologies

Across two councils, we identified four interpretable classes, from a low-need group to a high-need group with extensive ADL and IADL support. As need severity rose of the classes identified, dementia and other long-term conditions became more prevalent, as expected. Importantly, once detailed need items were included, simple demographics such as age and gender contributed little to class assignment. This underlines the added value of person-centred assessment content over simple demographics in understanding care profiles. The replication of the four-class structure across areas that record data differently suggests that the classes might reflect real patterns rather than local artefacts.

The classes did not appear to be merely descriptive. They predicted meaningful differences in the services people received and in subsequent outcomes. Lower and mid-need groups made more use of preventative or time-limited support, and a non trivial share improved over follow-up. For example, users in these groups were more likely to have short-term services and to step down from higher to lower intensity care. By contrast, the highest-need group had the most intensive packages, the highest monthly community costs, and the highest mortality, which indicates limited scope for improvement and complex multimorbidity. These gradients suggest a practical targeting rule. Efforts to restore function, such as through reablement and home-based rehabilitation, are most likely to yield benefits in lower and mid-need classes, whereas high-need users require stable, adequately resourced support with an emphasis on continuity and carer involvement.

Changes through time

The longitudinal analysis added three points. First, overall rates of improvement and deterioration were similar across the two councils and in line with patterns observed among older people receiving social care in population studies. This appears to supports the external validity of the administrative data based findings. Second, in one council we saw a discrete increase in recorded improvement shortly after twelve months from first assessment. A plausible interpretation is that recovery was captured at the scheduled review rather than at the point when change actually occurred. If so, the timing of reviews is not neutral. Bringing forward reviews for groups with a realistic chance of improvement could allow earlier step-down of packages, with better user experience and lower costs. Third, trajectories differed by class and by council. In particular, the lowest-dependency class deteriorated more quickly in one area than the other, with little recorded improvement. This coincided with a more frequent reassessment cycle, which may shape what is recorded as change, but could also reflect differences in local case mix and service pathways. Commissioners should therefore interpret trajectories in light of local review policies and reassessment triggers.

Strengths and limitations of administrative data

Using administrative data brings important challenges. Items can change over time, some variables are missing or defined differently across areas, and forms are designed for case management rather than research. We attempted to mitigate these issues by harmonising items, using all available assessments with full maximum likelihood methods, and being explicit about variables that could not be compared. Even so, gaps remain, for example the absence of a consistent indicator of living alone in one council. The sample covered only those eligible for publicly funded support, so the results generalise to local authority service users rather than to all older people with care needs. In addition, the two councils in the analysis are not nationally representative, and similar analyses based on a wider set of authorities would be important.

Also, we selected a four-class solution on grounds of interpretability, even though statistical criteria might have supported five classes. This conservative choice aided the policy interpretability of the results. Future work should test whether the measurement model is stable across councils and years, assess alternative class numbers using external validation, and model transitions between classes to understand movement over time, for example decline from a mid-need class to a high-need class after a fall or hospital admission.

Policy implications

Our results suggest some important policy implications. First, class membership could provide a useful “language” for operational teams. It might be embedded in case discussions and used to guide resource allocation and assessment patterns. For instance, a user in a mid-need class with recent functional gains could be placed on a short review interval, offered reablement, and given clear step-down criteria, while a user in the highest-need class could be scheduled for a longer interval with rapid access triggers for deterioration and a carer support check.

Second, review schedules should be risk-stratified. Assessment scores and class flags can be used to set default intervals, shorter where improvement as well as deterioration is likely and longer where change is rare. Objective triggers can pull reviews forward, for example a fall, emergency department attendance, or carer breakdown, and sustained improvement can trigger reductions in support. This approach would reduce unnecessary contact for stable users, focuses assessor time where it adds value, and bring forward decisions that improve user experience and reduce cost.

Third, the findings make a strong case for strengthening data quality and governance and for standardising assessment content across councils. A national core of structured items should cover ADLs, IADLs, cognition, mobility, safety, mood, communication and carer context, recorded on common scales and accompanied by metadata on assessment type, date, reason for review and form version. Quality should be supported by data validation rules, regular audit and feedback, staff training, and version control. With these foundations, analyses could become comparable across areas, unwarranted variation could be identified, and cross area learning maximised.

Finally, these results have direct relevance for England's Social Care Client Level Data. Embedding a structured assessment core and linking it to service components, hours and costs, and, through data linkage, to outcomes such as hospital use, care home admission and mortality, would enable councils to map users into validated need profiles and to track change reliably. The same infrastructure would support risk-stratified reviews, better targeting of preventative support, and more consistent commissioning. None of this implies automation of eligibility decisions. Rather, it equips practitioners and commissioners with better information, interpreted through professional judgement, to target limited resources in a fair, person-centred way.

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Tables and Figures

Table 1: Characteristics of the social care users aged 65+ living in community at the first assessment in two Local Authorities (LAs) analysed.

	LA_1		LA_2	
Characteristics	N=9,388	%	N=5,485	%
Age				
65-74	1,500	15.98	937	17.1
75-84	3,540	37.71	2,077	37.9
85+	4,348	46.31	2,471	45.1
Gender				
Female	6,233	66.4	3,588	65.4
Unpaid care				
Has a carer	6,191	66.0	3,038	55.4
Lives alone				
Yes	N/A	N/A	1,665	30.4
Primary support reason				
Physical disability	7,914	84.3	4,702	85.7
Health conditions				
Dementia	474	5.05	2,748	50.1
COPD[1]	N/A	N/A	475	8.7
Cancer	N/A	N/A	888	16.2
Acquired physical injury	N/A	N/A	1,270	23.2
Stroke	195	2.1	1,259	23.0
Acquired brain injury	N/A	N/A	2,661	48.5
Neurological	N/A	N/A	797	14.5
Mental health	N/A	N/A	1,703	31.1
Sensory impairment	193	2.1	1,817	33.1

[1] Chronic obstructive pulmonary disease

Table 2: Service use at assessment point (older people living in community)

	LA_1 n of assessments = 24,867	LA_2 *n* of assessments= 8,077
Service	%	%
Receiving home care	66.3	52.3
Receiving short-term support	8.9	-
Receiving day care	-	7.0
Receiving direct payments	6.2	5.9
Receiving meals	-	16.7
Receiving telecare	18.6	21.7
Monthly community care cost (in £s)	240	204
Died in community	22.8	18.8

Table 3. Needs profiles overall and by latent class in Local Authority 1 (*n* of assessments = 24,867)

		Lowest dependency	Moderate dependency		Highest dependency
			No cognitive impairment	Cognitive impairment	
% requiring support	All *n* = 24,867	Class 1 *n* = 1,427 (6%)	Class 2 *n* = 5,723 (23%)	Class 3 *n* = 9,610 (39%)	Class 4 *n* = 8,107 (33%)
Seated Transfer	31.3	18.4	13.8	2.7	68.3
Toileting	53.4	34.1	32.3	24.2	93.8
Mobility	72.9	53.5	65.8	52.4	97.5
Standing	44.9	27.5	25.7	7.2	91.0
Getting in/ out of bed	47.1	28.4	28.0	12.2	90.9
Travelling	96.0	92.8	89.4	98.0	98.8
Personal care	93.8	18.2	95.6	98.9	99.0
Making decisions	76.2	1.1	68.0	84.3	85.7
Stay safe	91.2	6.0	94.2	96.3	98.0
Practical needs	4.4	1.2	4.4	4.2	5.0
Preparing meals	6.1	1.1	2.7	7.3	7.8
Going out and about	4.9	1.1	4.5	4.9	5.8

Table 4. Needs profiles overall and by latent class in Local Authority 2 (*n* of assessments = 8,240)

		Lowest dependency	Moderate dependency		Highest dependency
			No cognitive impairment	Cognitive impairment	
Requires support with:	All *n* = 8,240	Class 1 *n* = 640 (8%)	Class 2 *n* = 1,413 (17%)	Class 3 *n* = 3,779 (46%)	Class 4 *n* = 2,408 (29%)
Needs (0 to 5 scale)					
Eating	1.7	0.2	0.8	1.8	2.6
Dressing	3.2	1.4	2.2	3.2	4.4
Transfer	2.0	0.4	0.6	1.4	4.3
Housework	3.8	2.7	3.4	3.9	4.0
Getting out	3.6	2.3	2.9	3.6	4.2
Household shopping	3.8	2.7	3.5	3.9	4.0
Planning	3.2	1.7	2.6	3.5	3.6
Appearance	2.8	1.1	1.8	2.9	3.7
Preparing snacks	3.2	0.4	2.0	3.7	4.0
Preparing meal	3.6	0.5	3.2	3.9	4.0
Social action	1.7	1.1	1.5	1.9	1.8
Washing needs/day	3.5	1.9	2.7	3.5	4.5
Medicine needs/day	3.0	1.3	2.2	3.2	3.7
Toileting needs/day	2.5	0.5	1.0	2.3	4.4
Feeling safe (0 to 32 scale)	8.8	1.5	3.7	9.4	12.6
% requiring support					
Emotional well-being	55.1	28.5	41.9	60.2	61.1
Memory/orientation	60.1	16.7	43.4	69.5	65.0
Behaviour affecting self or others	26.7	10.4	17.3	31.1	29.0

Note: ADL/IADL needs in LA_2 ranged from 0 to 5, corresponding to full independence and very high levels of support needs, respectively.

Table 5. Fit statistics for the Latent Class Analysis of needs in care users 65+ in the two Local Authorities (LAs).

Number of classes	Loglikelihood	N of parameters	Vuong-Lo-Mendel-Rubin likelihood ratio test	BIC	Entropy
LA_1 (n = 24,867)					
1	-458024.35	23	-	916281	-
2	-433049.10	42	$p < 0.001$	866523	0.88
3	-422097.33	61	$p < 0.001$	844812	0.91
4	-415211.67	80	$p < 0.001$	831233	0.94
5	-410576.41	99	$p < 0.001$ [a]	822155	0.96
LA_2 (n = 8,240)					
1	-372604.32	62	-	745768	-
2	-351591.60	105	$p < 0.001$	704130	0.95
3	-341964.22	148	$p = 0.001$	685264	0.92
4	-337311.62	191	$p = 0.006$	676345	0.92
5	-333267.54	234	$p = 0.002$ [a]	667901	0.92

[a] VLMR-LRT cannot differentiate between the solutions in LA1 and LA2.. In LA_2 the entropy value does not improve with more classes. In LA_1 a 5-class solution provides the best entropy and BIC values. However, the contents of the five classes were difficult to interpret.

Table 6. User typologies in LA_1 (*n* of assessments = 24,867).

	Lowest dependency	Moderate dependency		Highest dependency
		No cognitive impairment	Cognitive impairment	
	Class 1 n=1,427 (6%)	Class 2 n=5,723 (23%)	Class 3 n=9,610 (39%)	Class 4 n=8,107 (33%)
Female	67.7	71.3	67.2	66.4
Dementia	2.6	6.9	4.1	8.26
Physical disability	92.0	89.3	87.9	78.2
Stroke	1.9	2.9	3.3	2.0
Sensory impairment	2.3	1.8	2.4	1.9
Unpaid carer	59.2	67.9	71.9	73.5
Age	81.9	82.6	82.6	83.2
Times assessed	2.9	4.3	3.8	4.0

Table 7. User typologies in LA_2 (*n* of assessments = 8,240).

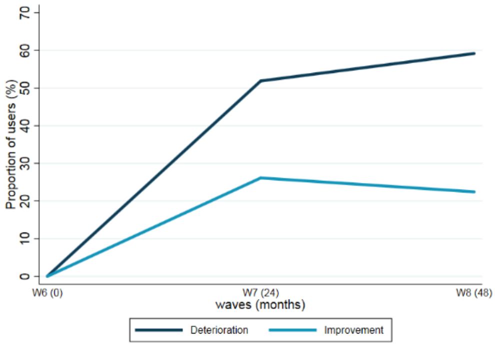
	Lowest dependency	Moderate dependency		Highest Dependency
		No cognitive impairment	Cognitive impairment	
	Class 1 *n* = 640 (8%)	Class 2 *n* = 1,413 (17%)	Class 3 *n* = 3,779 (46%)	Class 4 *n* = 2,408 (29%)
Female	66.3	65.9	64.8	64.1
Dementia	20.9	40.6	62.5	52.8
COPD	14.4	10.9	9.0	7.2
Cancer	19.8	18.0	16.7	13.7
Acquired physical injury	28.8	24.5	22.9	26.1
Physical disability	85.9	87.4	86.8	90.5
Stroke	17.5	16.8	22.0	32.6
Acquired brain injury	55.9	49.4	48.5	50.6
Neurological other	10.5	12.2	14.8	20.8
Sensory impairment	37.2	40.0	33.7	32.1
Mental health other	30.5	35.5	34.9	28.8
Lives alone	73.7	57.3	31.7	13.1
Has carer	30.6	51.2	63.7	64.0
Estimated means				
Age	83.1	84.3	85.4	86.1
N of assessments	1.7	1.9	2.1	2.0

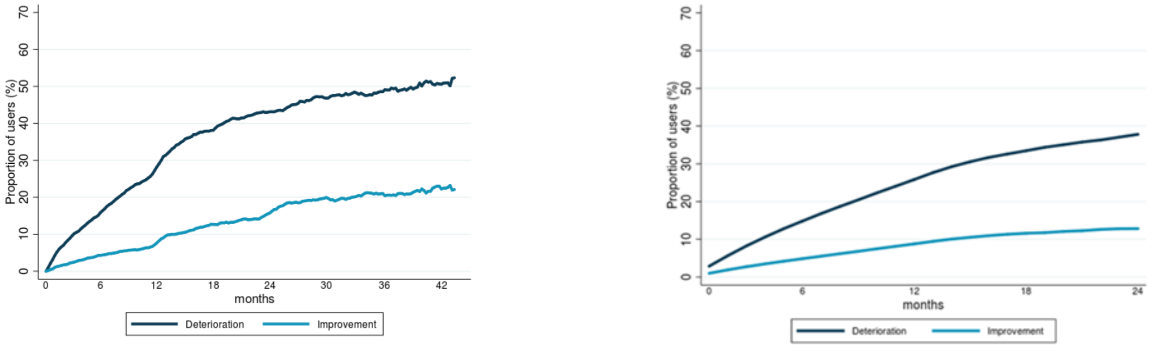
Table 8. Use of community care in the four needs typologies (classes).

	Lowest dependency	Moderate dependency		Highest Dependency
		No cognitive impairment	Cognitive impairment	
Local Authority 1	Class 1	Class 2	Class 3	Class 4
% Receiving home care	49.5	72.1	77.0	76.5
% Receiving short-term support	52.9	32.7	35.2	34.3
% Receiving direct payments	2.2	3.5	8.0	5.4
% Receiving telecare	27.2	28.1	26.6	24.6
Community care cost (£/month)	125.8	211.9	172.1	354.6
% Died	15.0	20.0	20 .1	30 .2
N of assessments (%)	1,427 (6%)	5,723 (23%)	9,601 (39%)	8,116 (33%)
Local Authority 2	Class 1	Class 2	Class 3	Class 4
% Receiving home care	36.9	47.9	54.2	58.1
% Receiving day care	3.0	4.5	9.2	6.4
% Receiving direct payments	1.8	3.7	6.2	8.6
% Receiving meals	13.0	24.8	17.1	10.3
% Receiving telecare	13.5	17.7	25.3	21.1
Community care cost (£/month)	105.1	120.5	182.3	305.5
% Died	15.2	20.2	14.0	25.2
N of assessments (%)	640 (8%)	1,413 (17%)	3,779 (46%)	2,408 (29%)

Figure 1: Patterns of deterioration and improvement over time

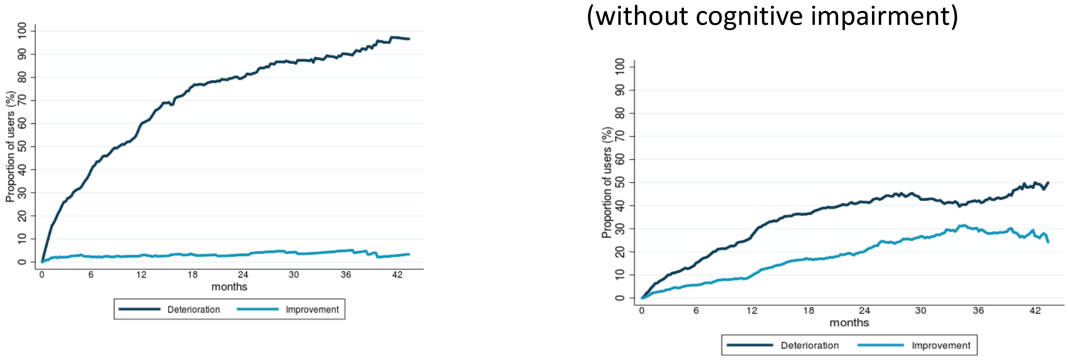
ELSA survey




LA$_1$ data

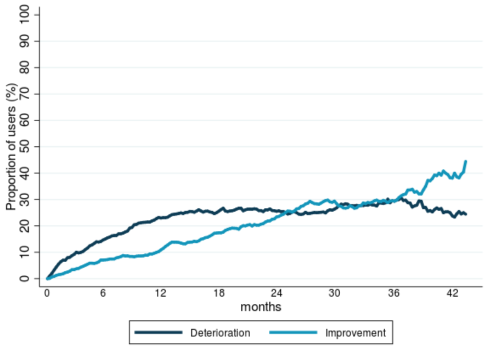
LA$_2$ data

Figure 2: Patterns of deterioration and improvement over time by class typology (LA$_1$ & LA$_2$)

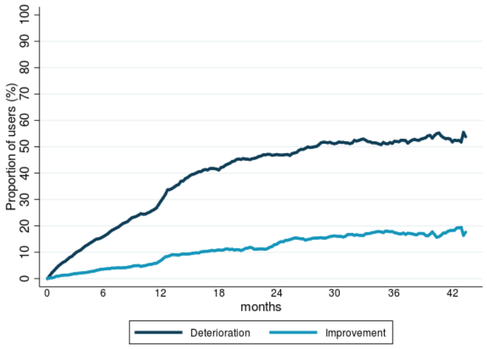

Class 1 (LA$_1$): 6% of users, low dependency

Class 2 (LA$_1$): 23% of users, moderate dependency (without cognitive impairment)

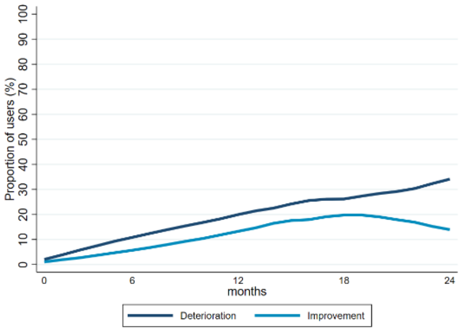
Class 3 (LA$_1$): 33% of users, moderate dependency (with cognitive impairment)



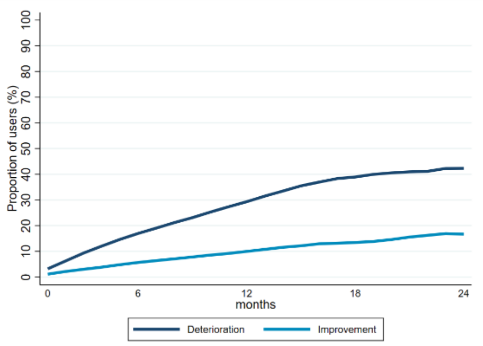
Class 4 (LA$_1$): 39% of users, high dependency



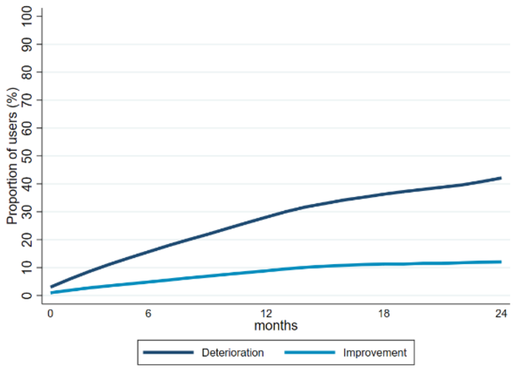
Class 1 (LA$_2$):10% of users, low dependency



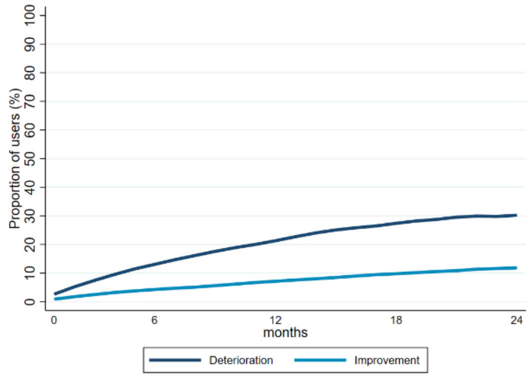
Class 2 (LA$_2$): 20% of users, moderate dependency (without cognitive impairment)



Class 3 (LA$_2$): 32% of users, moderate dependency (with cognitive impairment)



Class 4 (LA$_2$): 38% of users, high dependency



Appendix A. Prompt questions for assessing needs in LA$_1$

Needs dimension	Prompt questions in the assessment
Unpaid care	Do you receive support from family or friends?
Mobility and transfer support needs	Does the person require help with any of the following?
	Moving around in bed
	Get in/out of bed
	Standing/Sitting
	Seated transfers
	Toileting
	Mobility
Communication and sensory needs	Are there any specific sensory needs/conditions?
	Sight loss
	Hearing loss
Personal care needs	Which statement best describe your support requirements?
	No eligible needs identified
	I occasionally need help or encouragement with personal care needs
	I need a lot of support with personal care during the day
	I need a lot of support with personal care during the day and night
	I need two people to support with personal care
Preparing meals	Which statement best describe your support requirements?
	No eligible needs identified
	I need guidance about preparing meals
	I need assistance and supervision when cooking, preparing and/or eating my food
	I would like support to do these things independently in the future
	I need all/most of my meals prepared for me and/or total assistance to eat my meals
Making Decisions Support	Which statement best describe your support requirements?
	No eligible needs identified
	I occasionally need support
	I decide some things, but I don't take important decisions
	Other people make decisions about my life
Travelling independently	Does the person require help when travelling alone?

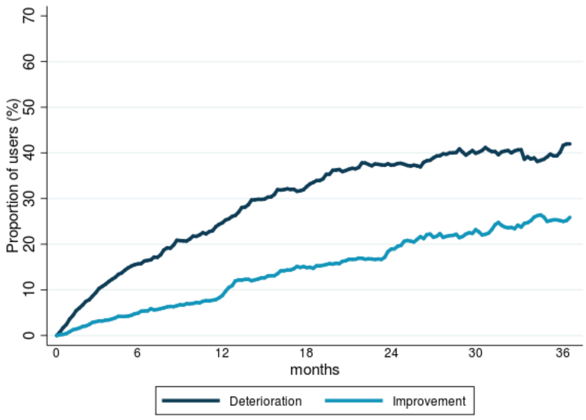
Appendix B. Prompt questions for assessing needs in LA_2

Needs dimension	Prompt questions in the assessment
Psychological well-being	Your level of need emotional well-being, memory/orientation, Planning & decision-making, behaviour affecting self or others (e.g. aggression, self-harm).
Safety and risk	The support you need to ensure you are safe during the day. The level of support you need during the night.
ADL	How independent are you when? Eating and drinking, dressing, undressing, maintaining personal appearance (e.g. hair, shave, wash hands), washing whole body (e.g. taking bath, shower) How often you need support? Using the toilet/managing continence, taking medication/using health aids, with transfers, preparing drink/snacks, preparing main meal, with housework (e.g. laundry, cleaning), with household shopping, with life planning/management (incl. doing paperwork or managing finances), getting out and about. Do you need help looking after children/other dependents?
Social participation and inclusion	Your level of need and how often you need support with Social activities and relationships (incl. cultural/leisure)? Your level of need and how often you need support with Work/education/training (incl. vocational)?

Appendix C. Sub-sample analysis (LA$_1$)

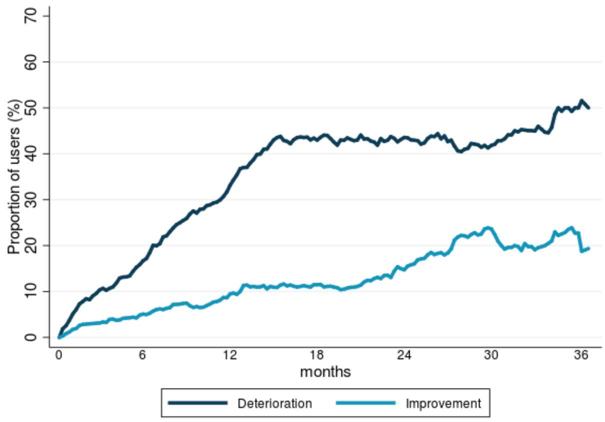
Sub-group analysis: Patterns of deterioration by gender and age group

Male users aged 65-84 living in community



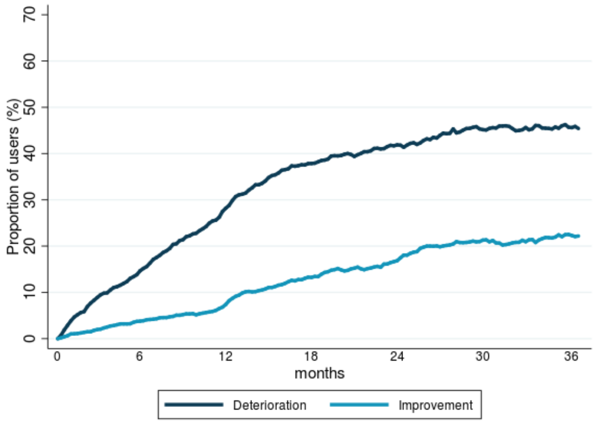
N=1,850

Male users aged 85+ living in community



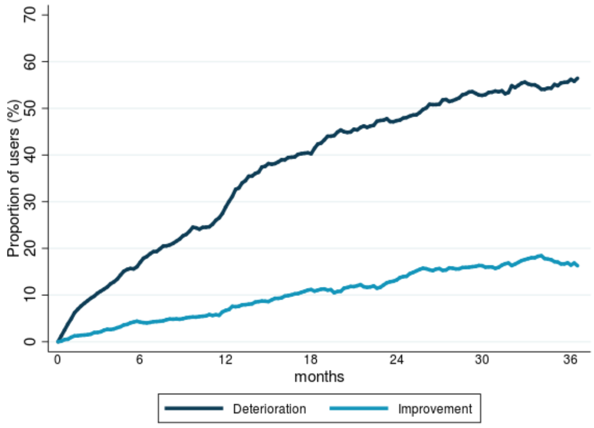
N=1,180

Female users aged 65-84 living in community



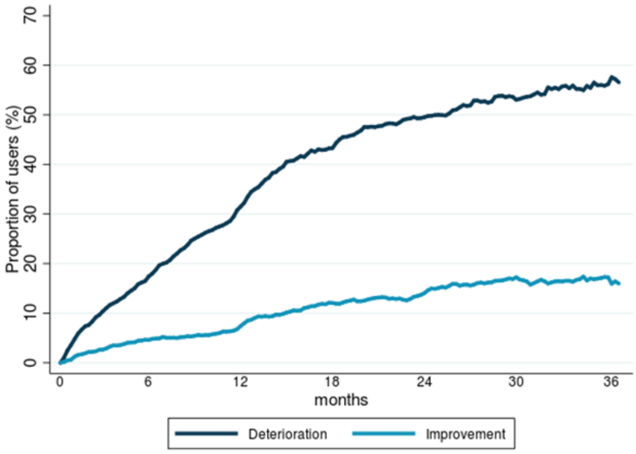
N=3,289

Female users aged 85+ living in community



N=2,192

Physically Disabled users living in community (65+)



N=3,329

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