

Identifying potential priority local authorities in England for intergenerational care facilities

Introduction

Services for both pre-school children and older adults face many challenges. Lack of funding for early years services (EYS) and adult social care (ASC) are influencing factors, whilst young populations in some areas and aging populations in others are putting pressure on current provision. EYS and ASC policies are largely separate, but a growing body of research highlights the effectiveness of intergenerational care facilities in tackling some of these challenges. The aim of this study is to understand where there may be opportunity for local authorities (LAs) to introduce policy encouraging intergenerational facilities, specifically areas currently lacking adequate provision.

Utilising LA level data, combining demographics with current services, a K-means clustering model has been used to identify potential areas that could benefit from intergenerational facilities in England. Supported by evidence from current research, variables have been chosen to show where the target population is greatest, and current provision is most constrained. These clusters have been developed into pen portraits, highlighting characteristics of each, and assessing the spatial patterns uncovered. Finally, the recommendation of which areas could be suitable for intergenerational care is outlined alongside a discussion of the limitations of this study.

Background and Literature Review

ASC and EYS are under pressure. The proportion of the population aged 65 and over is projected to grow 43% by 2040 (DHSC, 2021). With no national ASC budget, LAs determine provision and require £11.6bn by 2032 to meet demand (The Health Foundation, 2023). LA's ASC expenditure is second only to education (HoCL, 2024), emphasising budget pressures.

Challenges extend beyond finances. There are staffing issues, driven by high vacancy and turnover rates, worsened by relatively low pay (SfC, 2023). There is increasingly a focus on preventive methods to reduce demand for more complex care, with social engagement expected to play a key role (DHSC, 2021). Unsuitable housing affects this and can pose a health risk, with demand for specialist housing rising (DHSC, 2021).

Similarly, underfunding of EYS has resulted in nursery closures rising, with 98.4% losing money whilst facing increased staffing costs (NDNA, 2023). Simultaneously, changes to government policy for free childcare (DfE, 2023) has increased demand, putting additional pressure on already limited capacity in some areas (Early Years Alliance, 2023).

To improve both services, LAs must deliver efficient and effective operations (DHSC, 2023) – intergenerational facilities could help achieve this. Providing specialist care and services for older adults and children in one place creates economies of scale leading to reduced costs (Norouzi and Angel, 2023), whilst potentially addressing capacity and quality issues.

Studies have found that older adults have improved mental and physical health when residing in such facilities (Age UK, 2018; Albert, 2023), and children attending displayed enhanced social skills (Sisley, 2019). Benefits extend to the staffing teams, broadening their skillsets (Norouzi and Angel, 2023), which may improve retention and provides more role diversity. Intergenerational facilities also bridge community gaps (Sisley, 2019), providing an opportunity for generations to interact, resulting in ageism and associated stereotypes being challenged (Age UK, 2018).

This analysis aims to identify potential priority LAs for intergenerational facilities where current ASC and EYS service provision is constrained. The hypothesis is that there will be LAs where populations of children and older adults are above average, and the ratio of children-to-EYS and older-adults-to-ASC-facilities is high.

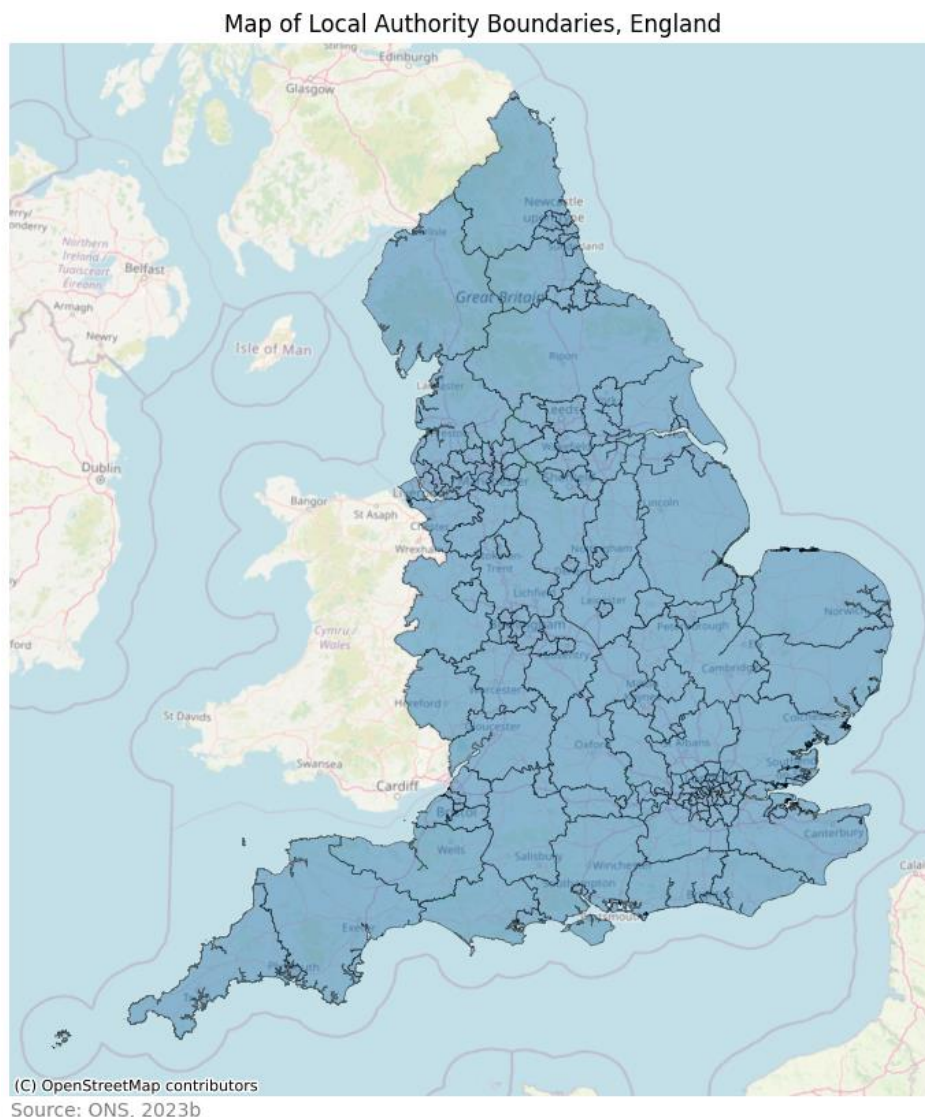
Methodology and analysis

This section provides a brief overview of the analysis process. Full details of each stage are provided in the accompanying Notebook.

Overview of datasets

Several datasets are required in addition to the LA boundaries shown in Figure 1 below. Census age data (ONS, 2023c) gives the population under 4 and over 65 in each LA to find where target populations are greatest. Care homes represent provision for older people (CQC, 2024) whilst EYS represents provision for pre-school children (Ofsted, 2024). In terms of location, EYS data only includes postcode, so the ONS Postcode directory (ONS, 2024) is used to add latitude and longitude information. This is not the exact location but is suitable for this analysis as data is aggregated to LAs.

Figure 1. Context map



Explanation of features

Features for modelling must reflect where opportunity for intergenerational facilities is greatest. Proportions of target populations present potential demand. However, EYS and care home location and capacity data must reflect current provision for that population. Each population group is divided by locations and capacity for the relevant service. Higher ratios mean the provision is constrained. Table 1 provides a summary of the features.

Table 1. Features for modelling

Feature name	Calculation	Purpose
% Population aged under 4	Population under 4 divided by Total population	Demand for EYS
% Population aged over 65	Population over 65 divided by Total population	Demand for Care Homes
Ratio of under 4s to EYS locations	Population under 4 divided by EYS locations	EYS provision (available locations)
Ratio of under 4s to EYS places	Population under 4 divided by EYS places	EYS provision (available places)
Ratio of over 65s to Care Home locations	Population over 65 divided by Care Home locations	Care home provision (available locations)
Ratio of over 65s to Care Home beds	Population over 65 divided by Care Home beds	Care home provision (available beds)

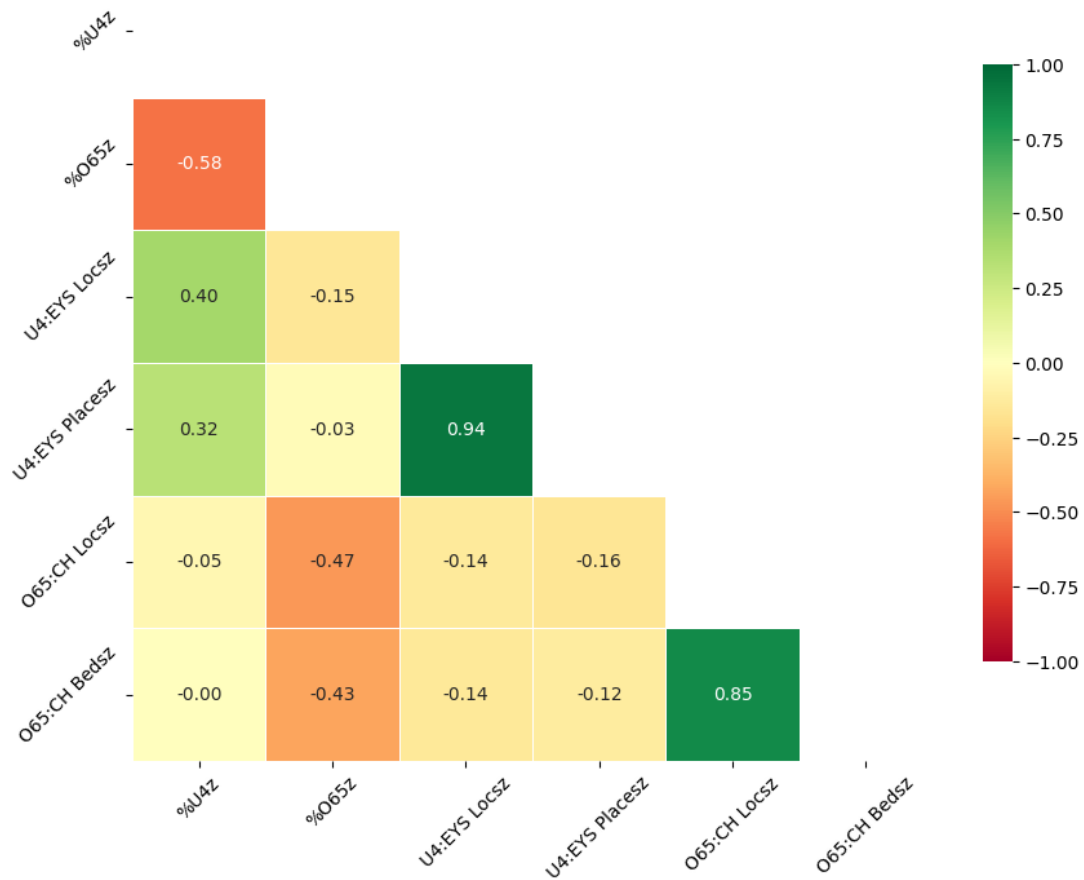
Feature standardisation

All features have the same polarity, such that higher values mean greater opportunity for new services, but scales vary and so must be standardised. Z-scores are used, giving a mean of 0 and standard deviation of 1, highlighting to what extent each datapoint deviates from the mean. This relies on features having normal distributions, confirmed in Figure 4.1.2. in the Notebook.

Collinearity checks

Whilst collinearity is not necessarily an issue, it is important to understand feature relationships. Figure 2 shows collinearity between location and beds/places ratios for the respective age groups. This is expected as generally more locations means more places/beds. There is some correlation between population aged under 4 and the EYS ratio features, whilst the opposite is true for over 65s and care home ratios.

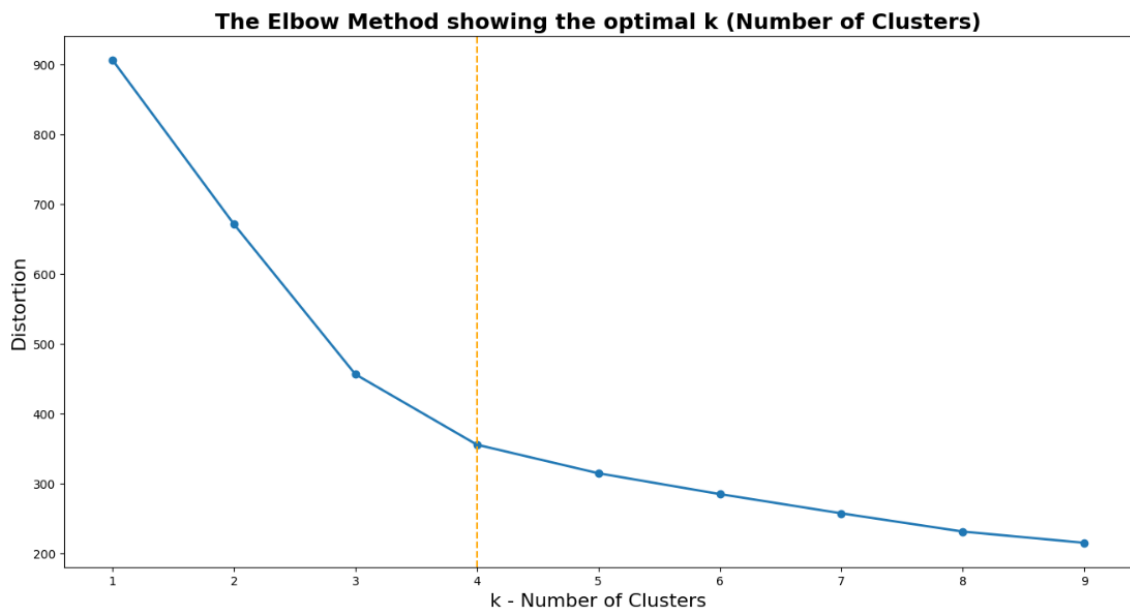
Figure 2. Correlation Matrix Heatmap of Z-Score Features



K-means clustering

An elbow chart (Figure 3) shows 4 clusters is optimal based on the drop-off in distortions, and testing confirmed this performed better than 3 clusters. ANOVA tests also showed a relatively small range of F-statistics, but age features were slightly lower suggesting these contribute less to the model overall. The full tests are in Section 4.3. of the Notebook.

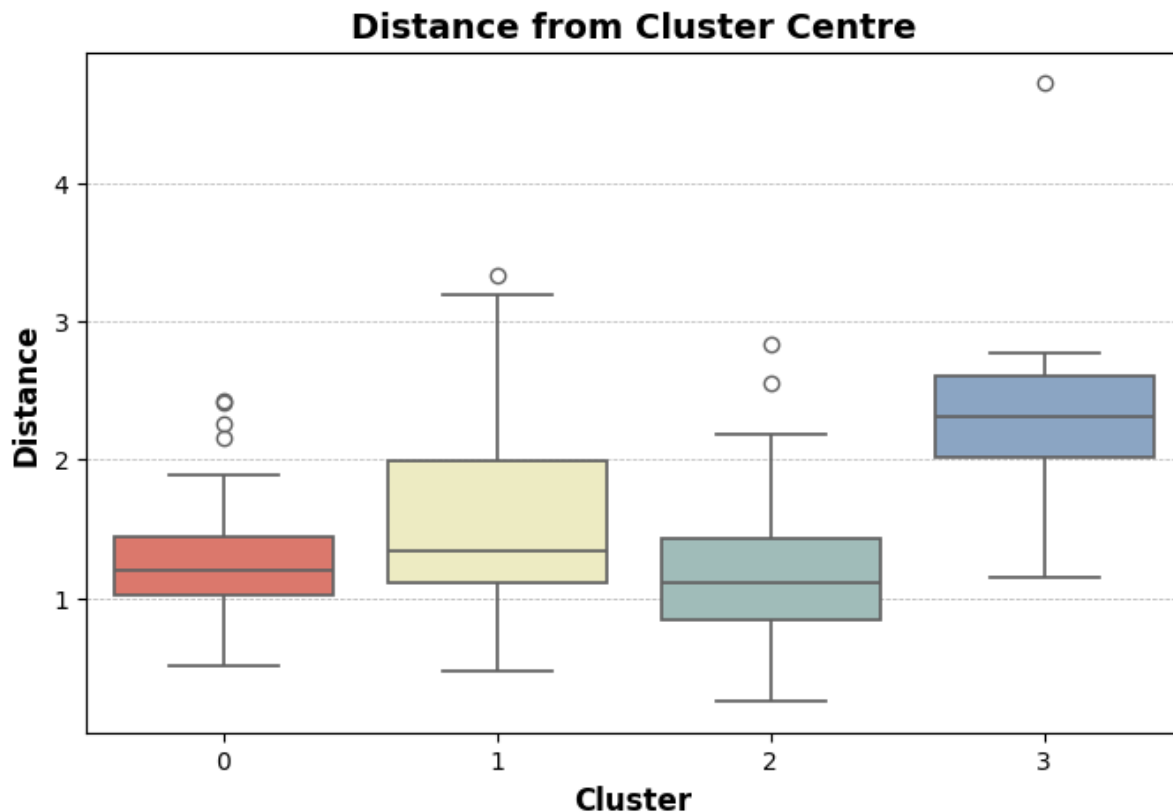
Figure 3. Elbow chart



There was an uneven distribution of LAs in each cluster, with one having just 10 LAs, all in London. These LAs have very high ratios of older people to care home locations and beds, driven by few care homes operating which is highlighted in London's spatial development strategy (GLA, 2021). This is not necessarily an issue but is important to understand.

Figure 4 shows the distance of each LA from its cluster centre to identify outliers. There are outliers in each cluster, but most data falls within the upper and lower quartiles, showing LAs are close to their assigned cluster centre. Statistics are reviewed fully in Section 4.3 of the Notebook.

Figure 4. Distance from cluster centres



Findings and discussion

The final cluster centres are shown in Figure 5, and pen portraits summarised in Table 2. Cluster 0 has an above average population aged under 4, but other features are about average. This implies a large EYS target population, but provision is currently in line with the average. This cluster is "Young areas with adequate provision".

Cluster 1 has an above average population aged under 4 and EYS ratios for locations and places. This implies current provision is poor with more children than average, and to each EYS location and place. This cluster is "EYS opportunity".

Cluster 2 has an above average population aged over 65, but below average proportion of children. All ratio features are slightly below average. These LAs have provision in line with the average despite the older population. This cluster is "Older areas with adequate provision".

Cluster 3 has significantly above average care home ratios, implying provision is lacking in these areas. However, the population over 65 is below average, but those living in these areas lack services. This cluster is "Care home opportunity".

Figure 5. Final cluster centres

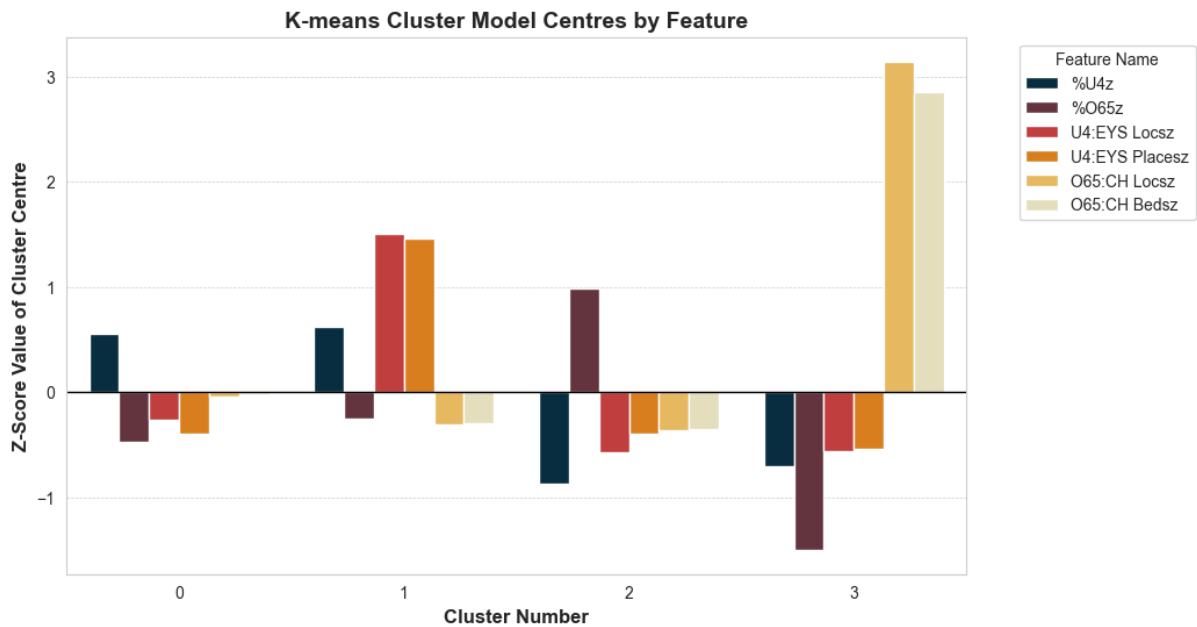


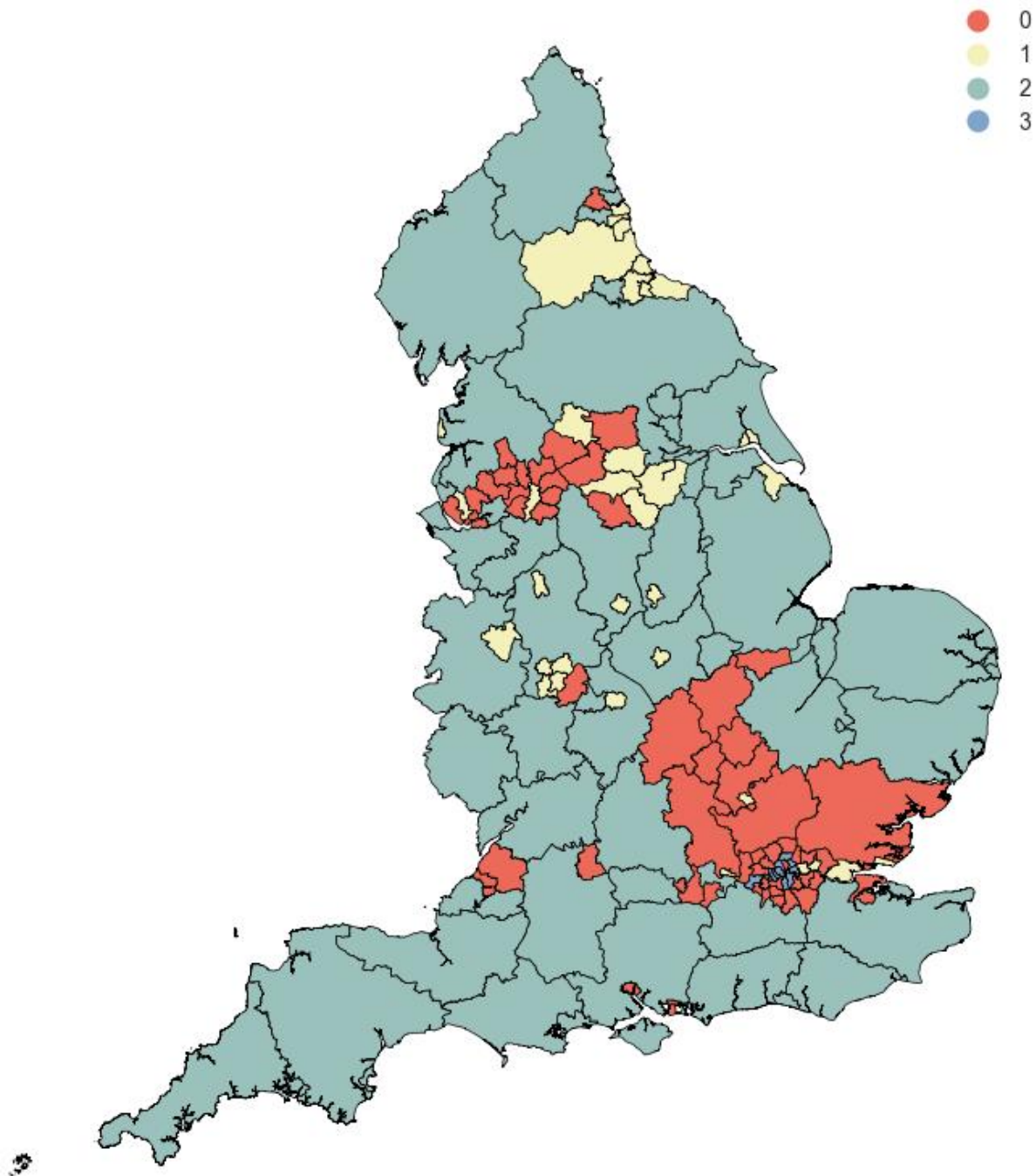
Table 2. Pen portraits

Cluster Number	Cluster Name
0	Young areas with adequate provision
1	EYS opportunity
2	Older areas with adequate provision
3	Care home opportunity

Figure 6 maps the results. Cluster 2 is mostly geographically large LAs with rural land such as North Yorkshire, Derbyshire, and Devon. In contrast, Cluster 1 includes mostly urban LAs, such as Derby and Leicester, and areas known for young populations, like Bradford (CBMDC, 2024). Cluster 0 is the most geographically varied including areas like Essex, Bedfordshire, and Leeds, alongside mostly urban LAs such as around outer London.

Figure 6. Map of clusters

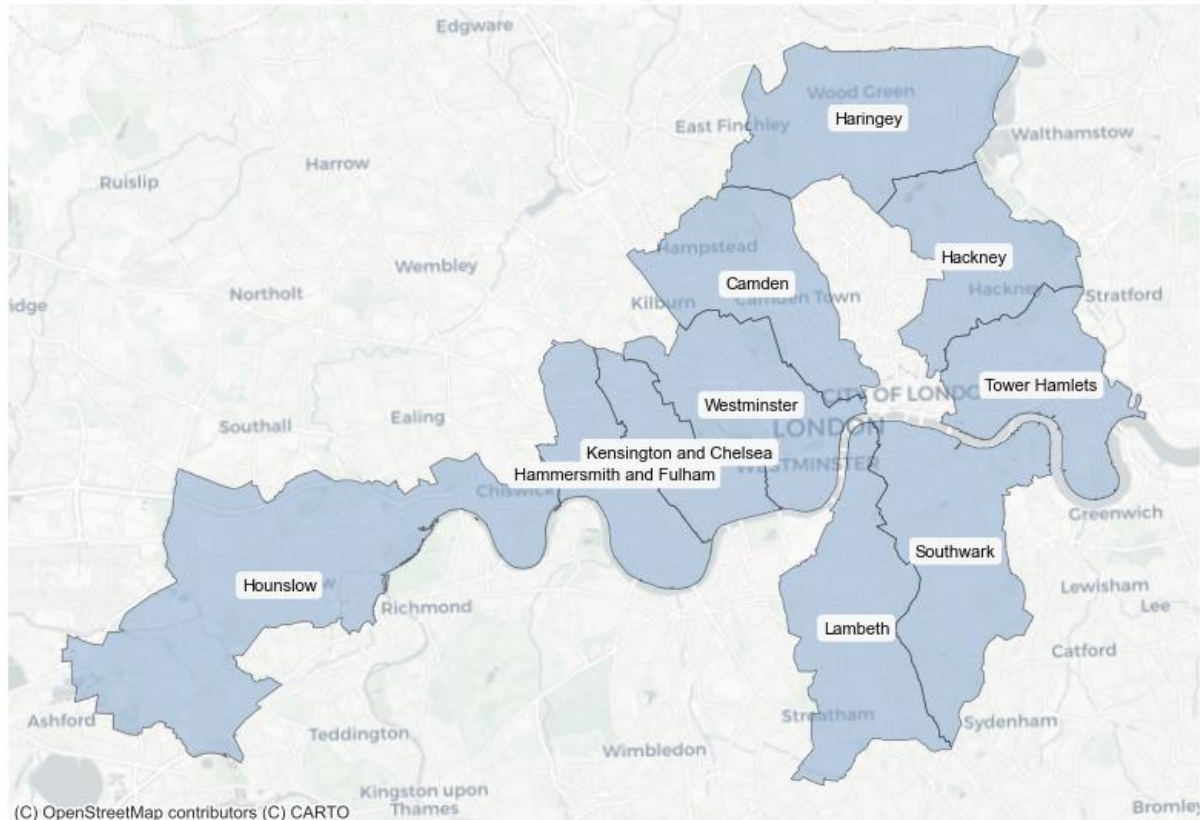
Map of K-means cluster model results



As discussed earlier, Cluster 3 is the smallest cluster and contains only LAs in London. Figure 7 focuses on these, highlighting all except Southwark and Lambeth are boroughs north of the Thames and relatively central within Greater London's borders.

Figure 7. Map of Cluster 3

Map of cluster containing London LAs only



Whilst these findings are interesting, none of the clusters are classified as intergenerational care opportunities. The hypothesis was that there would be a cluster with all features above average and therefore an opportunity for intergenerational facilities. However, the pen portraits highlight that the opportunity is currently divided as areas with an EYS or care home opportunity, not both.

The two opportunity clusters therefore suggest, at least in the short-term, focus on specific service provision may be needed. There are 1.6 million people over 65 that have unmet needs (Bosch and Isden, 2023) and as the population ages this pressure will increase. Similarly, if the trend of nursery closures continues (NDNA, 2023), then the model could change as the ratio of children to EYS locations and places rises.

In the long-term, however, there may be a role for intergenerational facilities to improve the quality of EYS and ASC. As aforementioned, intergenerational facilities showed improved mental and physical health in older adults (Age UK, 2018; Albert, 2023), and enhanced social skills in children (Sisley, 2019). This cannot be ignored as an opportunity for the future of care services.

However, there are limitations to this analysis that need consideration. Firstly, not everyone over 65 will want or need to live in a care home. Alternatives include retirement housing, but only those providing personal care must register with CQC (CQC, 2015). There are 600 of these (CQC, 2024) but no capacity data. Those not providing personal care do not need to register, including retirement villages which are larger developments with a breadth of facilities (Housing Care, 2016). These arguably align well to the intergenerational facility concept, so investigating current provision of these further is critical.

Secondly, whilst both EYS and ASC are managed by LAs, this is a large, diverse geography. Populations and communities vary within LAs and finding a suitable smaller geography requires investigation. Tests using Wards (ONS, 2021), which have broadly similar populations, were not found to reflect communities well, with many Wards having no EYS or care home services. Further research is required to better reflect community boundaries.

Finally, this study focuses on the present not the future. A temporal study of birth rates and population under 65, would enhance the analysis by understanding future demand. Within this, socioeconomic considerations could help improve demand estimates in the model by factoring in means to self-fund. This could improve policy by being predictive rather than reactive to the current population's needs.

LAs may build on the results of this study, working with industry partners and intergenerational care specialists to explore implementation options, including the case for additional funding in more deprived areas where ability to self-fund is limited. This could influence EYS and ASC policy reform to fully integrate into a comprehensive state offer.

Conclusion

ASC and EYS services are facing numerous challenges, with the results of this study highlighting constraints on provision are not universal. In the short-term, LAs can use the clusters to focus on increasing ASC or EYS provision in their areas as needed. However, in the longer-term there is potentially still an opportunity for intergenerational facilities despite the hypothesis tested in this study not being proven true.

The limitations discussed highlight that there is further opportunity to improve this study, retesting the hypothesis and increasing the robustness of the model. Finding a more appropriate geography, expanding the data to cover all ASC housing types, and building in a predictive view of the future population and its demand will better inform LAs in their policies and decision-making. Intergenerational facilities take time to plan and implement, and so this temporal view is perhaps most critical to influencing future policy.

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