UNIVERSITY of STRATHCLYDE
FRASER OF ALLANDER INSTITUTE

A model for projecting the number of older people drawing on adult social care services in Scotland.

A discussion paper on replicated analysis for Scotland

April 2026

Background

The research in this discussion paper contributes to the Fraser of Allander Institute's programme of work focusing on the social care sector in Scotland.

It is a continuation of our work related to modelling social care demand, with our previous report providing an approach for estimating the future number of people with learning disabilities drawing on social care services in Scotland.

This work comes within the context of wider social care reform, partly stemming from the decision not to implement a national care service in Scotland and the newly legislated Care Reform Act (2025). As part of this act, the Scottish Government have specific reporting requirements on projected social care needs in Scotland, to be published at the end of 2026 and every five years thereafter.

Long-term projections of demand for care services, and the associated expenditure, are fundamental to any reforms of the social care sector, to ensure reforms are evidence-based. A model for projecting future demand and expenditure is available for England and Wales, developed and maintained by the Care Policy Evaluation Centre (CPEC) at the London School of Economics.

This discussion paper is, therefore, two-fold. The first part seeks to explore the feasibility of replicating CPEC's long term care projection model in Scotland. The second part provides an approach for replicating their methodology with the constraints of the available data to project the future number of older people drawing on social care services in Scotland.

Throughout this report we refer to different terminology and concepts that may be unfamiliar, for this reason, we include an index is Annex A.

An optimal approach to modelling demand and expenditure

To better contextualise the evidence, we set out on the approaches to modelling demand and expenditure for social care throughout this paper, it is first good to understand what a 'perfect' model might look like, including where data limitations did not exist.

If this were the case, the best way to understand and plan for social care in Scotland would be to build a model that works to simulate "virtual Scotland", showing how people's needs (and thus demand for services) change over time, how services respond, and how the cost base changes as a result of changes in level of need.

In simple terms, this means that there are several factors that must be considered.

- **People**: The model would represent individuals and families, including their age, health, disabilities, income, and whether they have family or friends who can help. It would also consider where they live—because rural and urban areas face different challenges.
- **Time horizon:** People's needs change and thus the model would follow how health and care needs grow as people age, and how life events—like illness or care availability—affect demand.
- **Choices and constraints:** It would show what services people are likely to use (home care, residential care, day services, etc.), based on their needs, preferences, and costs. It would also consider systemic factors, such as waiting lists and local availability, and behavioural factors like those providing unpaid care provided for friends and family.
- **Reflect the system:** The model would take the supply of social care services into account, including care providers, staff numbers, budgets, and policies. It would show what happens if there aren't enough workers or if funding changes. This would also account for the demand for services that is not met by the system, due to capacity or supply constraints.
- **Forecast and test scenarios:** While a static macro-simulation model can be helpful, a more dynamic model could help to better simulate the sector and answer questions related to:
    - Changes in funding in the social care sector
    - The implications of rising wages for the social care workforce
    - Changes to eligibility requirements or charging principles.
- **Distributional impacts**: The model would estimate future demand, waiting times, and spending—both public and private—and highlight how changes affect different

groups (for example, older people in rural areas or families in deprived communities).

Existing models for projecting social care demand

There are various models involved in projecting future levels of demand and expenditure for adult social care services in England and Wales.

The first is the CPEC (previously PSSRU) long-term care projections model which aims to project demand and expenditure for adult social care services. This model is a macro-simulation model, which utilises available data to model population level outcomes on usage of adult social care services in England and Wales.

The second is the CARESIM model, developed by the University of East Anglia. This model is a micro-simulation model which utilises a sample of the population for England and Wales, taken from the Family Resource Survey. This model is used to estimate the shares of the older population that required to contribute towards the cost of their care.

CPEC long-term care projections model

The Care Policy Evaluation Centre (CPEC) long-term care projection model aims to project four key variables related to social care usage. These include:

1. The future number of disabled older people
2. The level of demand for long-term care services and disability benefits for older people
3. The public and private costs associated with meeting this demand.
4. The social care workforce required.

What is important is that the model does not make forecasts of these variables, and instead using the data and evidence available, makes projections based on certain trends and assumptions. The model only accounts for the met need of formal and informal care, and does not consider unmet need, something that is within scope for future research.

The model itself contains four key components:

1. Estimations of the number of older people with different levels of disability by age group, gender, household type and tenure.
2. Estimated levels of unpaid care, long-term care services and disability benefits required based on the probability of receiving certain care.
3. Projects the estimated total health and social care expenditure.
4. Disaggregates total expenditure by source of funding.

A fifth part of the model explores the supply side of social care, which whilst not within scope of this research, is of interest to us for future research.

Below we set out CPEC's method for each of these components in more detail[1].

1. **Estimating the number of older people with different levels of disability by age group, gender, household type and tenure.**

This stage utilises data published by the Office for National Statistics and Health Survey for England to divide the older people according to several characteristics relevant to their use of formal services. This includes factors such as level of functional disability, marital status, household composition and tenure, and education.

2. **Estimating the levels of unpaid care, long-term care services and disability benefits required based on the probability of receiving certain care.**

Projecting the number of users of unpaid and formal care and the volume of services demanded utilises estimates generated in Stage 1 with functions that assign receipt of unpaid care and formal care services to each sub-group of the older population.

To do so, census data, and data from CPEC's survey of care homes, is used to disaggregate the overall share of the old age disabled population by those in residential home care, nursing home care and long-stay hospital care. Bivariate probit analysis, a statistical method used when exploring how variables are related, is also used to determine the factors associated with the receipt of unpaid care and formal community-based care.

The fitted values i.e. the model's predicted probabilities, are then used to estimate the probability of receipt of each care type by age band, disability and other factors mentioned in Stage 1.

3. **Projecting the estimated total health and social care expenditure.**

Total expenditure on the formal services demanded is projected by applying unit costs of formal care to the volume of services projected in Stage 2.

4. **Disaggregating projected expenditure by source of funding.**

This stage breaks down the projected aggregate expenditure on services by source of funding including NHS, social services and services users.

University of East Anglia (UEA) CARESIM Model

The CARESIM model is an alternative model used for projecting demand and expenditure. It is a micro-simulation model that uses a sample of the older age population taken from the Family Resource Survey.

[1] For more technical insight, please see Wittenburg et al (2018) and Adams et. Al (2016).

This data includes individual level data on the incomes, wealth, housing and other characteristics of the sample what members of the older age population are required to pair towards their care costs should they need it.

This includes simulating how individuals and households are assessed, charged and pay for the adult social care services that they require under the current system and proposed reforms. It is often used to project demand, expenditure and the distributional impacts for the older population and is often referred to alongside the CPEC long-term care model.

For each simulation within the model, various needs are considered. These include:

1. Home care needs, including three different levels of needs (low, medium and high) and a category covering all direct payments.
2. Care home needs, including nursing care in an independent home, places which provide personal but not nursing care in independent homes, places in local authority run homes which provide personal but not nursing care, and NHS fully funded nursing home places).

The main aim of this model, as stated, is to assess the distributional effects of alternative care charging regimes and how they affect the difference in long-term costs between the state and the individual. These simulations are conducted for a base year and then projected forward for future years.

Our Approach

Our aim is to establish a programme of work for social care research in Scotland that helps to inform evidence and policy making.

The current scope of our work is to evaluate whether the CPEC long-term care projections model, i.e. the macrosimulation demand model, is replicable for Scotland, and if so, how we could do it. Replication of the microsimulation CARESIM model is not within scope.

To replicate a version of the CPEC model for Scotland, equivalent data is required capturing similar variables and data for the Scottish population. Throughout this section we discuss the data available, including the relative strength of what is available to robustly replicate the 4-stage approach taken in the model for England and Wales.

We evaluate the relative strength of data and evidence available for each stage based on several factors; these include:

- Timeliness – this includes how regularly the data is produced and when the most recent data is available for relevant to the current year.
- Data match – this accounts for how well the data, and variables within, match that used in the CPEC model.
- Completeness – where data can be matched, how complete data is for relevant variables is important, particularly where data may be available however large shares of incomplete data exist. This also accounts for whether the sample sizes are good enough to use as part of the model.

It is important to note that our decision to evaluate the ability to replicate the CPEC model in Scotland does not mean that the CPEC model is the only option available, or the most appropriate way to model demand and expenditure. As we highlight later in the paper, several limitations exist within the CPEC model for England and Wales, which carry over when looking to replicate the model for Scotland.

Stage 1: Understanding the older population according to their characteristics relevant to the use of social care services.

The first part of Stage 1 of the CPEC model uses population projections provided by the Office of National Statistics to disaggregate the population for England and Wales by age band and gender. This helps to understand how many people fall within the old age group and forms the basis for the projections until the year 2035.

When collecting equivalent data for Scotland, the National Records for Scotland are responsible for publishing population projections for Scotland. At present these are 2022-based, meaning any projections would use 2022 as the baseline year. Our expectation is that more updated population projections will be published in the coming months. Despite this, the data is complete and is a near direct match to the data used from the ONS. This also provides projections up to and including 2047, providing a good basis for longer-term projections.

Variable	***CPEC Source***	***Our Model***	***Timeliness***	***Data Match***	***Completeness***	***Relative Strength***
Breakdown of population by age and gender	ONS	NRS	2022 latest year			

The second part breaks down the older age population into disability groups.

The CPEC model measures disability as the ability to perform activities of daily living (ADLs) and instrumental activities of daily living (IADLs).

ADLs account for the ability to complete tasks such as bathing, personal hygiene and grooming, toileting and continence, eating and feeding, dressing and moving and transferring. IADL's relate to more task-based activities such as managing money, your household and health, as well as preparing meals, communicating with people and shopping. These are particularly important given that the level of disability faced by an individual is likely an indicator for use of social care services, particularly the older an individual may be.

In particular, the CPEC model uses data from the Health Survey for England, which includes six categories functional disability, ranging from no disability to those unable to perform three or more activities of daily living without assistance.

Looking to Scotland, available data on share of the older age population by level of disability is sparse. Our analysis so far has highlighted two data sources that currently collect information of different levels of ADLs and IADLs.

This includes data collected as part of Understanding Society, an annual UK-wide household survey that provides data on various economic and social indicators.

Individual level data on whether an individual can perform each of the activities of daily living is available within Understanding Society. Despite this, there is varying levels of completeness for each of the required variables, with low Scotland specific sample sizes making some variables unreliable for use.

As well as this, Understanding Society is categorised in Waves based on when the survey was in the field. The latest Wave that included questions on ADLs and IADLs was 13, meaning the most up to date data on this would be for 2023.

There exist some other data sets that have sought to capture the number of individuals who have difficulty with performing activities of daily living, these include:

- The Healthy Ageing in Scotland (HAGiS) study conducted by researchers across Scotland to provide a longitudinal study of ageing.
- The Scottish Health Survey, conducted annually, which asks a panel of individuals about their health, the health services they utilise and their behaviours towards health in Scotland.

Variable	***CPEC Source***	***Scottish equivalent data***	***Timeliness***	***Data Match***	***Completeness***	***Relative Strength***
Share of older age population by ability to complete activity of daily living	Health Survey for England	Understanding Society	2023 latest year			
		HAGiS				
Share of older age population by level of disability		Scottish Health Survey				

The final parts of Stage 1 use ONS projections to break down the older age population by their marital status and household composition. This is included because both marital status and household composition are useful proxies for how types of care may be funded by individuals.

Housing tenure and education is also deemed an appropriate proxy for socio-economic status, with analysis conducted to include the breakdown of the older population by each of these factors.

These variables are collected as part of Understanding Society and are also available in the Family Resources Survey.

Population breakdown:	***CPEC Source***	***Scottish equivalent data***	***Timeliness***	***Data Match***	***Completeness***	***Relative Strength***
By household type	ONS Marital Status and Cohabitation projections	Understanding Society				
By marital status	Health Survey for England and Wales	Understanding Society				
By housing tenure		Understanding Society				
Education level projections	Health Survey for England and Wales	Understanding Society				
	CPEC CARESIM Model	Family Resources Survey				

Stage 2: Projecting the number of users of unpaid and formal care services, and volume of services demanded.

The first part of this stage utilises the estimates generated in Stage 1 of the modelling i.e. the projected numbers of older people by disability, household type and other characteristics.

These estimates are combined with functions that assign the receipt of unpaid and formal care services to each sub-group of the older age population. This includes services related to a range of health and social services relevant to meeting long-term care demands.

This means that the relative strength of Stage 2 depends heavily on the strength of Stage 1 modelling. This also holds true for subsequent stages within the model.

To estimate the model base year in the CPEC model, census data and data from the CPEC (previously PSSRU) survey of care homes allowed researchers to estimate the proportion of disabled older people in residential home care, nursing home care and long-stay hospital care.

The number of the older age population by service type is expressed as a percentage of the overall number of highly disabled people i.e. those unable to perform three or more ADLs without help or in care homes) for each subgroup by age band, gender, household type and tenure. These proportions are then used to project future levels of care receipts in the future.

In Scotland, significant progress has been made to estimate the in-year share of the population supported by social care services, produced by Public Health Scotland (PHS) and collected in collaboration with each of the Health and Social Care Partnerships across Scotland.

PHS publish annual statistics on the number of people supported by social care services, providing breakdown by different sub-groups of the population and care type.

This, somewhat, mitigates our need to estimate these figures ourselves, particularly from any other publicly available data sources.

Variable	*CPEC Source*	*Scottish equivalent data*	*Timeliness*	*Data Match*	*Completeness*	*Relative Strength*
Share of older age population by social care service usage	Census Data and CPEC(PSSRU) own survey.	Public Health Scotland Insights on Social Care	2017/18 - 2023/24 latest year			

The second part of Stage 2 then seeks to estimate the probability that an individual is in receipt of unpaid and formal community-based care.

This is done by using a bivariate probit analysis, utilising data, again, from the Health Survey for England and Wales. This regression analysis was used to determine the factors associated with receipt of unpaid and formal community-based care.

These probabilities, or the fitted values from the regression, were used to determine the demand for unpaid and formal community-based care by age band, disability and factors outlined in Stage 1.

Multiplying these fitted values with the projected number of older people within each subgroup estimates the number of care recipients.

The panel-like nature of the Health Survey for England provides CPEC a consistent approach for analysing the probability that individuals are in receipt of care, providing the ability to break these estimates down by the identified sub-groups.

As stated, the requirement for CPEC to complete this stage is borne from the lack of available data on the number of people supported by different types of social care services, and thus, they must estimate this themselves.

Whilst the PHS data provides us this insight, and thus mitigates our need to do so, our feasibility study has still explored the ability to replicate the CPEC model in full.

The CPEC model assumes a theory-based behavioural framework of care use, with formal care receipt understood as the outcome of the interaction between need, resource, preferences and system-level constraints rather than a single determinant.

This means that level of disability accounts for only one factor associated with care, and considers other factors such as age, gender, living arrangements, household composition, access to informal care, housing tenure, income and wealth, among other factors.

Whilst existing evidence and our conversations with the CPEC team have highlighted these factors considered, there does not exist a comprehensive list. This means that assessing how we could replicate this, in its entirety for Scotland, is not possible.

To replicate the CPEC model in its entirety, including estimating social care usage estimates in a similar way, we would require more detail on the variables associated with care receipt, and appropriate sample sizes within relevant data to run these regressions.

The Public Health Scotland insights data allows us to bypass this step, providing us with good estimates of those in receipt of care, however.

Stage 3 and 4: Projecting total expenditure on formal services demanded by source of funding.

The third stage of the CPEC model projects total expenditure on the formal services demanded, multiplying unit costs of formal care to the volume of services projected in Stage 2.

The CPEC unit cost approach is grounded in economic theory and is designed to estimate the long-run marginal opportunity cost of delivering health and social care services. Rather than using prices or budgets, they aim to capture the full value of resources required to provide one additional unit of output, assuming services can adjust capacity over time. This makes the estimates suitable for economic evaluation and policy modelling, where consistency and comparability across services and settings are essential.

In practice, the CPEC model appears to follow a bottom-up (micro-costing) methodology. For staff-based services, they combine national pay data with employer on-costs (such as National Insurance and pensions), full allocations of overheads (management, administration, estates, and non-staff costs), and capital costs (buildings, land, and equipment). Capital items are annuitised over their expected lifespan using standard public-sector discount rates. Annual costs are then converted into costs per hour or per contact by adjusting for realistic working time, accounting for leave, sickness, training, and the proportion of time spent on client-related activities.

For services such as residential care, day care, or care packages, they aggregate all relevant inputs—staffing, accommodation, overheads, and capital—and divide total costs by an appropriate measure of output, such as bed-weeks or attendances. Where high-quality national data are unavailable, they draw on research studies, provider surveys, or undertake primary costing work, documenting assumptions clearly.

Deriving similar estimates for the unit costs of social care services in Scotland is the most challenging component of our replication exercise, with no real consensus on robust cost estimates or a methodology for calculating these.

The most obvious solution would be to use Local Government Finance Statistics published by Scottish Government to estimate the overall public expenditure by local authorities on social care services. This could be inflated to current prices, split into different service types, and divided by an identified measure of care usage such as people supported or hours of care provided. An alternative would be to use CPEC's unit costs and adjust these for differences in factors such as wage growth and social care policy between England/Wales and Scotland.

Despite this, any attempt to model the unit costs of care would be experimental and would form a significant research project.

The fourth stage of the model takes overall expenditure derived in Stage 3 and attributes to the source of funding including the NHS, social services and service users. In more detail this means:

- The costs of health services, related to long-stay hospital care and care in nursing homes, is assigned to the NHS.
- The costs of social services are divided between local authorities and service users.

The CPEC model also highlights the lack of national data on the quantities of privately funded care, meaning their projections for privately funded care, especially non-residential care, should be treated with caution. This means that it is not possible to verify that all privately funded care is captured within the model.

The ability to complete Stage 4 of this CPEC approach dependent on completion of Stage 3, given that to disaggregate funding by source, we must first understand the overall expenditure derived from our unit cost estimates.

Our experience analysing social care funding in Scotland has highlighted that despite strong data and information on how much money is allocated in Scotland, it is difficult to disentangle how this funding flows from national to local government, and into services.

This is only compounded when seeking to understanding the costs of social care, and thus funding at a more granular level. For this reason, we have excluded the expenditure component of this modelling from the second part of this research, with a view to scoping out the potential to conduct this research in the future.

Summary

This feasibility study has examined whether the CPEC care projection model can be replicated within a Scottish policy context, with reference to the ambitions set out in the Care Reform Act. The central finding is that full replication of the CPEC model is not currently achievable. This is primarily due to limitations in data availability, timeliness, linkage, and sample size, which collectively constrain the technical robustness and policy relevance of any attempt to mirror the model in its entirety.

While Scotland benefits from a rich range of administrative and analytical data across health, social care, and local government, these data are not yet sufficiently aligned, integrated, or designed for long-term projection modelling. Much of the information is collected for operational or reporting purposes, published with significant time lags, or fragmented across systems, limiting its suitability for modelling a rapidly evolving care landscape. In this context, the challenge is not an absolute absence of data, but a mismatch between the requirements of a robust projection model and the maturity of the underlying data infrastructure.

In a policy environment characterised by rapid reform and changing service delivery models, reliance on partial or outdated data risks producing projections that quickly lose relevance. Without sustained investment in standardised, timely, and linkable datasets—particularly across social care, community services, and the workforce—attempts to fully replicate an external model such as CPEC risk creating false precision rather than meaningful insight.

The findings therefore point to a staged and proportionate approach. Strengthening data governance, improving coverage and consistency, and clarifying how projections are intended to inform decision-making should be seen as necessary precursors to full model adoption. Until these conditions are met, replicating the CPEC model in full is likely to remain constrained in both validity and usefulness.

That said, the study also identifies clear areas of opportunity. While a granular understanding of social care usage is currently limited, Scotland does have sufficiently strong data to support more focused projection work. It is possible to develop an approach for estimating future numbers of older people likely to draw on adult social care services. The model outlined in the remainder of this paper should therefore be understood not as a definitive or official forecasting tool, but as one pragmatic means of increasing understanding, and of moving towards more robust and transparent estimation than has been possible to date.

In this sense, the value of the work lies less in full replication of the CPEC model, and more in demonstrating how selected elements of its approach can be adapted to the Scottish context to support learning, capacity-building, and incremental progress toward more effective care planning.

A model for projecting the number of older people drawing on social care services in Scotland.

This part of our research seeks to provide an approach for projecting the number of older people drawing on adult social care services in Scotland.

It is first important to note that there is believed to be levels of unmet need in the social care system[2], including those self-funding, those awaiting social care services, and those with eligible conditions or disabilities, but unaware of their own eligibility for services or unable to access or afford it. This paper focusses on projecting 'met' need, however, looking at how many older people will draw on social care services under current eligibility criteria.

Further to this, given the significant evidence gaps related to the cost of care services and their associated value, highlighted earlier, we only seek to provide projections of demand for services in Scotland. This is because there is no agreed approach to estimating the unit costs of care in Scotland, a fundamental part of estimating expenditure in Scotland.

Our approach, therefore, considers only the 'met' need for adult social care and seeks to project the number of older people drawing on adult social care services under the current eligibility criteria.

Where possible, we have followed a similar methodology to the CPEC model, seeking to estimate future levels of disability for the older age population in Scotland and social care usage to make projections of the future.

Our model utilises three main data sources:

- Understanding Society data for waves 9 to 13, to estimate the share of the population reporting a disability by age and gender.
- Public Health Scotland Insights in Social Care data to estimate the number of people utilising social care services in Scotland.
- National Records for Scotland 2022-based population projections by age and gender.

These three data sources form the basis of our approach, seeking to make estimates for the base year, 2022, given this is the latest year of population projections, and estimating levels of demand into the future.

Estimating the share of older age population who report a disability by age and gender.

[2] See Scottish Government

The first part of our model disaggregates the older age population i.e. those aged 65 and over, in Scotland, by 10-year age band, gender and whether they report an impairment or disability.

We explored the usability of several measures of disability, including in terms of sample sizes. This included using:

- Understanding Society to estimate the share of the older age population who report difficulty with 3 or more activities of daily living and independent activities of daily living, in line with the CPEC model.
- Understanding Society to estimate the share of the older age population who report an impairment or disability.
- Understanding Society to estimate the share of the population in receipt of disability benefit.
- The Family Resources Survey to estimate the share of the older age population reporting a disability within the core and broader equality act definitions.
- The Family Resources Survey to estimate the share of the older age population in receipt of disability benefits.

Table 1 highlights the differences in levels of reported disability for those aged over 65, depending on the data source and measure of disability used.

Table 1: Estimated shares of older population with disability by source and measure

Data Source and Measure	Males Over 65	Females Over 65	Total Over 65 Population
Understanding Society – Reported disability or impairment	44%	47%	45%
Understanding Society – Reporting difficulty with 3 or more ADL's	68%	68%	68%
Understanding Society – Receipt of disability benefit	16%	12%	14%
Family Resources Survey – Core Equality Act Definition	40%	46%	44%
Family Resources Survey – Broader Equality Act Definition	58%	59%	59%
Family Resources Survey – Receipt of disability benefit	13%	15%	14%

Source: FAI Calculations, Understanding Society Waves 9 - 13, Family Resources Survey 2021-2023

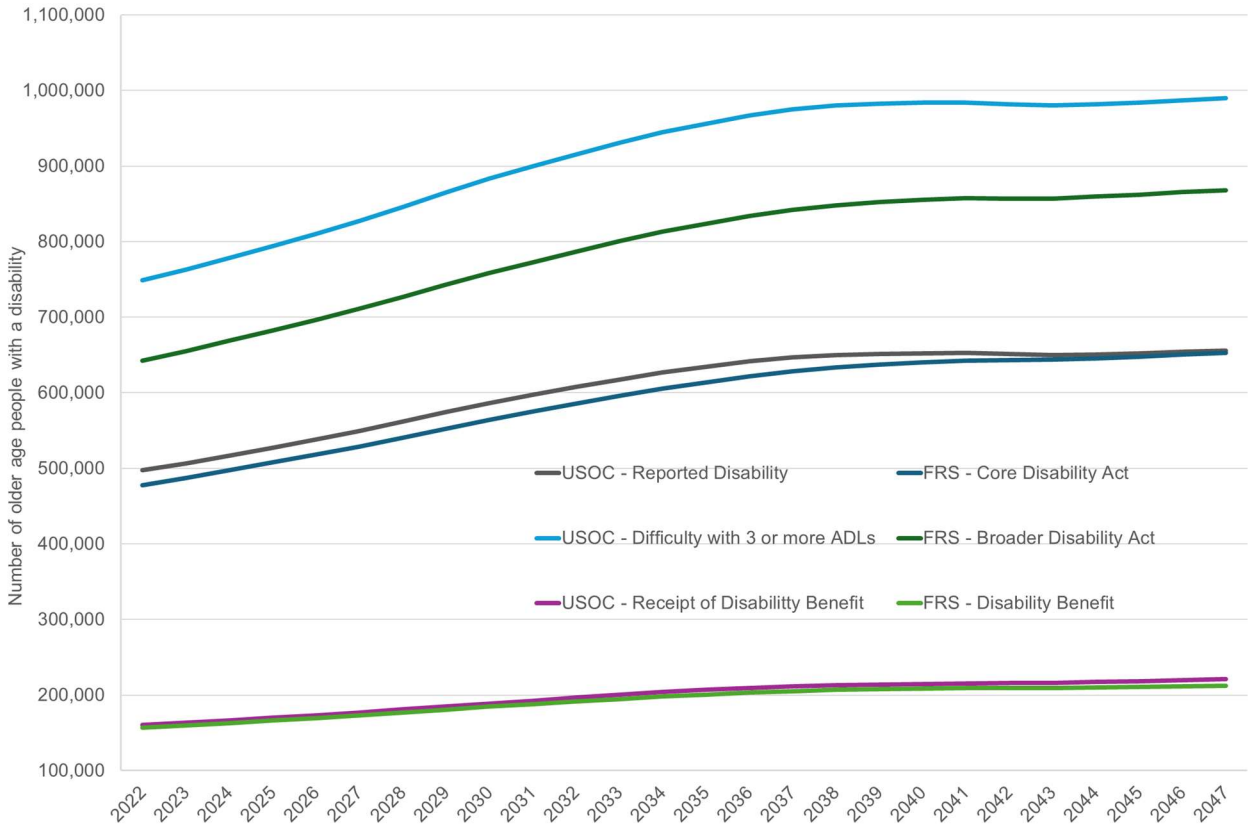
Like the CPEC model, we operate a cell-based model, estimating the share of each of subgroup reporting a disability by their age band and gender. This ensures that any specific prevalence of disability for a particular group is accounted for in our model.

To estimate the total share of the older age population by age and gender reporting a disability, we calculate the total number of people reporting a disability as a share of the total population by age group and gender.

These proportions are then applied to the 2022 base year of the population projections, to estimate the future levels of disabled older people in Scotland.

Chart 1 highlights the differing projections of the number of older people in Scotland with a disability.

Chart 1: Projected future levels of older age disability by source data and measure



Source: FAI Calculations, Understanding Society Waves 9 - 13, Family Resources Survey 2021-2023

Our results highlight that the projected number of older people with a disability in Scotland differs based on the measure of disability used, related to the differing shares of the population highlighted in Table 1.

Following the CPEC approach for estimating disability level i.e. those reporting difficulty with 3 or more ADLs, yields much higher numbers, which is also similar when using the FRS broad disability act measure.

Looking at both the FRS core disability definition and Understanding Society's reported disability or impairment definitions yield lower levels, with those using reported disability benefit likely underestimating levels of disability.

When comparing to the most recent Scottish Census, around 1.3 million people reported having a long-term health problem or disability that limits their day-to-day activities.

This highlights that regardless of definition, our approach may still underestimate the prevalence of disability in the older age population for Scotland.

Despite this, the level of disability is not used as the key variable within our model and is used to estimate the share of disabled people utilising social care services, which we discuss next. Because our projections of social care demand are calibrated to the 2022 base year, it is the gradient of disability prevalence across age and sex, interacting with projections of how these demographic factors will change across the population as given in the first stage, that determines our final projections.

1. Projecting the number of disabled older age people who utilise social care services.

The second part of the model seeks to estimate the total share of the disabled older age population utilising social care services in Scotland.

In the CPEC approach, bivariate probit analysis is used to estimate the factors associated with receipt of social care services, and thus the number of individuals in receipt of care services based on this.

This is because, in England, estimates of social care usage are not available, with these models seen as the best available approach for estimating this.

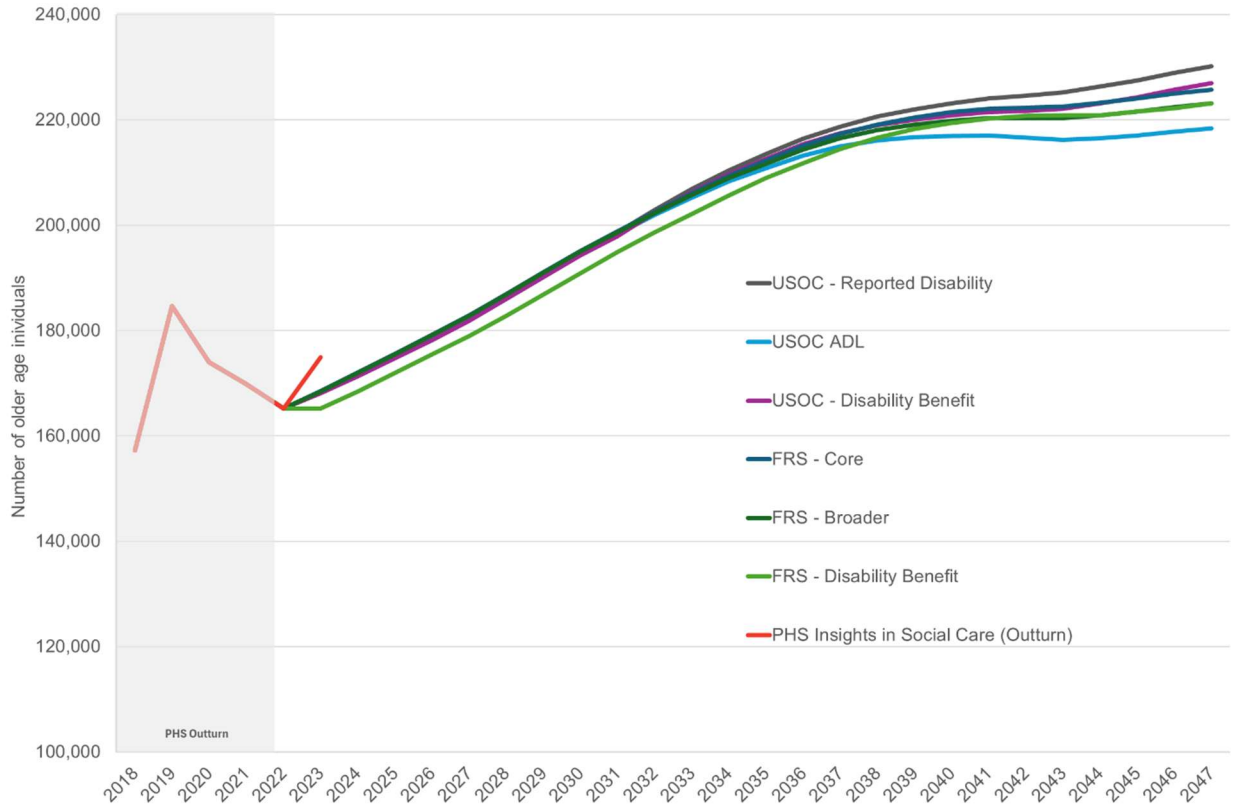
For Scotland, we can utilise the Insight on Social Care publication, produced by Public Health Scotland, to identify the number of individuals utilising social care services by age band and sex.

We divide the number of people utilising social care services by the number of older disabled people – calculated in stage 1 – for our base year.

This proportion is then applied to each year of the population projections published by the National Records for Scotland, to 2047.

Chart 2 shows the projected number of people drawing on social care services from 2018 – 2047, with the years before 2023, outturn from the PHS insights data, and 2023 onwards, our projections.

Chart 2: Projected number of older age adult social care users in Scotland (2022-2047)



Source: FAI Calculations, Understanding Society Waves 9 - 13, Family Resources Survey 2021-2023, National Records for Scotland 2022

This analysis shows that despite outturn data suggesting a slight fall in the number of older people utilising social care services, the number rises into the first year of our projection and continues to increase gradually until the early 2040's, before levelling out.

This can likely be attributed to two key parts of our model. The first is that given the cell-based nature of our model, the prevalence of disability will be affected by the age and sex composition of the population, meaning the share of the older age population drawing on social care services is tied to the number of disabled older people.

The second is that the rising number of people drawing on services can be somewhat attributed to a rising population in Scotland over the same time. In essence, we are assuming that the share of disabled older people utilising care services is the same as our base year, 2022, for every year of the projection, therefore as the population grows, so too does the number of people drawing on services.

The number of older people drawing on care services is therefore projected to be around 230,000 people in 2047 under our highest projection, 39% higher than in our 2022 base year. As noted, variance in the projections implied by the different disability

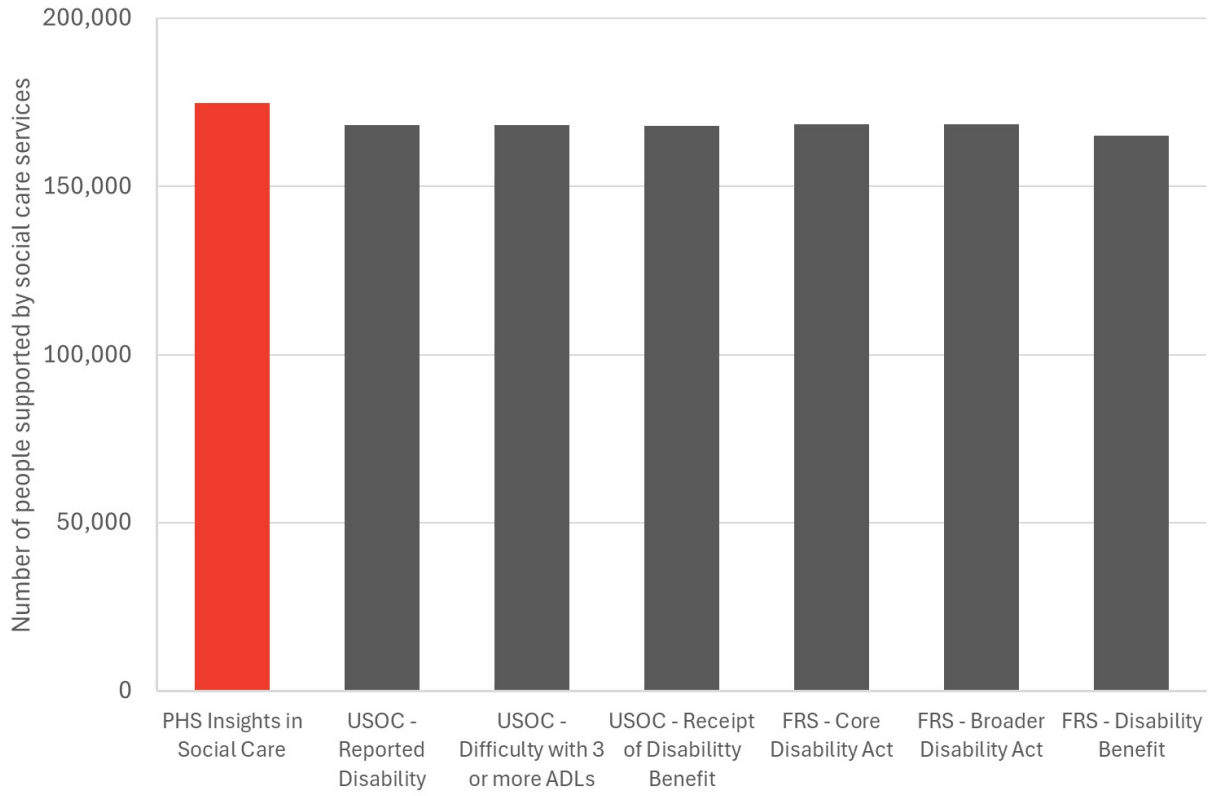
measures reflects differing gradients of disability prevalence by age and sex, rather than differing levels of disability prevalence.

It is important to note that this exercise is an exploratory attempt at modelling the future number of older people drawing on social care services, with a number of assumptions and data limitations underpinning the estimates produced.

This means that these estimates must be treated with caution, with the assumptions and data informing them requiring revisions before we can have confidence in the projections. Despite this, our projections compare well to the outturn data published by Public Health Scotland, suggesting that even with limitations, our estimates are comparable to more official estimates produced, highlighted in Chart X.

This suggests that whilst certain assumptions would require revision before we have confidence in our estimates, that our model performs well relative to similarly produced estimates, and provide a good starting point from which to build a more comprehensive model in the future.

Chart: Number of older people supported by social care services, Outturn vs Projection Comparison, 2023



Source: Public Health Scotland 2023/24, FAI Calculations

Summary

The work described in this paper is our first comprehensive attempt at estimating the future levels of older people drawing on adult social care services in Scotland.

We have broadly replicated the approach taken by the Care Policy Evaluation Centre to estimate future levels of demand in England and Wales.

The results of our research highlight that despite outturn data showing a reduction in the number of older people drawing on adult social care services, over the horizon of our projections, the number of people grows sharply.

Our research has highlighted the challenges faced when trying to replicate the CPEC model for Scotland. In particular, the lack of available data on disability and social care service usage, particularly at a granular level, makes it difficult to build a cell-based model.

Despite this, building an understanding of social care demand is possible, with Scotland showing strengths in the data available for social care usage, albeit at a more aggregate level. The Public Health Scotland insights data is a significant strength, with the estimates not only a useful source of data for modelling exercises, but a good benchmark to compare projections to.

Whilst the exercise conducted is not an official approach to modelling future levels of demand, with significant assumptions and limitations requiring revisions before we can have confidence in our projections, it is a start.

Our feasibility analysis has highlighted that modelling expenditure is particularly challenging. Substantial research is required surrounding the unit costs of care, and the funding landscape for adult social care, before we can incorporate this into our modelling.

This is important given that projections of demand only ask one part of the policy question, with expenditure equally important to understand how funding for adult social care services may have to change to meet levels of demand.

What have we learned?

Whilst this is not a complete modelling exercise for modelling future levels of demand, this attempt outlines one approach for projecting future levels of people drawing on social care services in Scotland.

Throughout this process we have encountered several challenges that affect our ability to build a model of this nature. This means that our attempt to conduct this exercise is 'best case' with much more required to provide official estimates. Despite this, we have learned a lot about our ability to both replicate the CPEC approach in Scotland and build a macrosimulation model for projecting future demand for adult social care services. These include:

Determining the level of disability in Scotland is difficult.

As mentioned, understanding how many people are disabled in Scotland can be difficult, with much of the available data high-level, making any granularity in terms of characteristics or demographics unattainable.

This means that the ability to build a cell-based model is constrained by our ability to breakdown the number of disabled people at as small a statistical level as possible. Disability is also measured in different ways, and it is not clear which measure is most suitable for our purposes.

This is crucial given that our approach is dependent on our ability to first determine the level of disability at the old age population, to understand future levels of care required.

Whilst sources such as Understanding Society and the Family Resources Survey can provide robust insight, at least by age and gender, where other variables exist, sample sizes for any further breakdown are too low to conduct robust analysis.

To build a more comprehensive model for determining future levels of demand, improved data on the number of people with a disability by household type, education level and household composition, among other variables, is required to build a cell-based model of this nature.

More granular understanding of costs associated with care are necessary.

When we commenced this research, our ambition was to conduct a feasibility study for replicating the CPEC model in Scotland and providing best possible estimates for both demand and expenditure.

Despite this, this project has highlighted that whilst there exists data for modelling demand, the availability and quality of data on the cost side is very limited, making this exercise currently unfeasible.

To project future levels of expenditure of social care services, we are required to estimate the unit costs associated with receipt of care.

Understanding the met need of adult social care services is only the first hurdle.

As we mentioned throughout, our model only captures the met need of adult social care, i.e. those who have been identified as in receipt of care because of a formal assessment and their needs are addressed.

There exists a significant proportion of the older age population, who are likely eligible for social care services who have not yet been identified, but may benefit from services now or into the future.

For this reason, any estimate produced will underestimate total service demand, with significant work required to both define the unmet need of the population, and capture this as part of modelling attempts.

Collaboration is key for social care research.

Whilst not specific to our modelling, our broad scoping exercises has reemphasised some of the challenges with navigating the social care data landscape in Scotland.

As aforementioned, whilst Scotland benefits from a rich range of administrative and analytical data across health, social care, and local government, these data are not yet sufficiently aligned, integrated, or designed for long-term projection modelling, or comprehensive analysis in Scotland, more broadly.

Much of the information is collected for operational or reporting purposes, published with significant time lags, or fragmented across systems, limiting its suitability for modelling a rapidly evolving care landscape. In this context, the challenge is not an absolute absence of data, but a mismatch between the requirements of a sophisticated projection model and the maturity of the underlying data infrastructure.

Further to this, much of the rich administrative data available is siloed across the organisations and sectors that collect it, making it difficult to access or use for social care research.

To improve social care research in Scotland, a more collaborative approach may be required, setting clear expectations on how data is governed and made available to advance many of the research questions that remain unanswered.

We remain committed to improving this collaborative environment, aiming to bring stakeholders together across social care, to provide the evidence and information that is required to support reform.

Next steps and continuous improvement

Whilst the aim of this research was to provide a more informed approach for modelling the number of older people drawing on adult social care services, we also wanted to highlight the difficulties in doing so, to prompt a conversation on what is required.

As mentioned, in order reform the social care sector, an appropriate understanding of the number of people drawing on social care services, and the associated expenditure is essential.

Despite this, our research has highlighted that whilst there exists data to provide a more informed approach than currently exists, our ability to build a robust model is constrained by the availability of data.

We welcome more recent announcements by Public Health Scotland and Research Data Scotland to include social care data within the national safe haven. This will significant enhance researchers ability to understand social care usage, and have identified this data as a potential route for improving our modelling efforts.

Our goal is to share this research with analysts across various areas, lead analysts at the Scottish Government, and our extensive network of senior leaders and analysts at organisations with interest and influence in adult social care in Scotland.

We hope that this will help to start a broader conversation around social care reform in Scotland, and highlight the existing evidence gaps, that if filled, could significantly improve the underlying evidence base for informed policy decisions surrounding social care.

It is important, however, to emphasise that the results within this research should not be seen as official projections of social care demand in Scotland. Instead, the whole exercise should be seen as one approach to model these estimates, and with significant improvements to underlying data sources and modelling, there exists the potential for robust estimates to be produced.

Our next steps, therefore, is to seek partners and funding opportunities to support our work to strengthen the research we have conducted as part of this discussion paper, but more broadly, to answer many of the research questions that will help to support broader social care reform in Scotland.

We welcome the recent publication of the Social Care Area's of Research Interest published by the Scottish Government and will endeavour to work with our policy colleagues to advance social care research in Scotland.

If you would like to discuss our research or help to inform our future social care research programme, please email us at fraser@strath.ac.uk.

Annex A – Key Terminology and Concepts

Met Need

This refers to the population of people who have had their needs assessed for support and have services and support packages in place to support their daily living. The research set out in our report refers to this population.

Unmet Need

Broadly, this refers to the population of people who may have a condition which, if assessed, would warrant social care support, but has not been provided. It can also refer to the group of the population who are unaware that their condition warrants social care support and thus have not sought an assessment. An agreed definition of unmet need has not been agreed unilaterally, however.

Micro Simulation

This is modelling technique that simulates the actions, interactions, and behaviours of individual "micro units"—such as people, households, vehicles, or firms—over time to predict aggregate population-level outcomes. Some examples include the IPPR Microsimulation model, or UKMOD.

Macro Simulation

This is a modelling approach that represents and analyses the behaviour of a system at an aggregate (macro) level by simulating how large groups, sectors, or the whole system evolve over time under different assumptions or policy scenarios.

Dynamic

A dynamic model is a model that represents how a system changes over time by explicitly accounting for time-dependent processes, feedback, and evolution of variables.

In a dynamic model:

- The state of the system at one time influences its future state.
- Variables are allowed to vary over time (e.g. growth, decline, cycles, delays)
- The model is usually run as a simulation over multiple time steps (e.g. years, months, seconds)

Put simply, a dynamic model is a way of understanding how something changes over time**,** rather than just looking at it at one moment. Instead of taking a snapshot, a dynamic model is more like watching a video**.** It shows how today's situation affects what happens tomorrow, next year, or further into the future.

Static

A static model is a model that represents a system at a single point in time, without explicitly accounting for how the system changes or evolves.

In a static model:

- Variables are assumed to be fixed or in balance for the period being considered.
- Relationships between variables are analysed without reference to time dynamics.
- The model describes conditions, constraints, or outcomes under a given set of assumptions.

Again, simply put, A static model is a way of understanding a situation at a single point in time. It's like taking a snapshot rather than watching a video. It shows how different factors relate to each other right now, without trying to show how things change in the future.

Projection vs Forecast

A projection and forecast are both tools for describing possible futures; however, they do this in slightly different ways.

A projection shows what would happen in the future if certain assumptions were to hold i.e. evaluating what would happen in the future if current trends were to hold.

A forecast is an informed judgement about what is most likely to happen, utilising available evidence, data and expert judgement to asses' different possibilities and uncertainties. This implies more of a level of expectation than a projection.

Our approach is a projection model, seeking to evaluate the current demand in the social care service and projecting this into the future.

Cell-based model

A cell-based model is a way of understanding a complex system by building it up from lots of small, individual pieces and watching how they interact.

Instead of describing the whole system at once, you focus on small units ("cells"), give each one simple rule to follow, and then see what happens when they all act together.

In the context of our model, this involves looking at small subgroups of the older age population i.e. those aged between 65 and 74, who are female, with a disability. We estimate the number of people who fit within groups related to certain characteristics. Aggregating these numbers up then allows us to make overall projections, whilst accounting for any differences within group.