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Improving social care outcomes: Do staff employment conditions make a difference? A quantitative analysis using secondary data from England

Stephen Allan, Florin Vadean and Olena Nizalova

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LSE The London School of Economics and Political Science
University of Kent
King's College London

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Introduction

Staff will play a key role in Adult Social Care (ASC) settings, delivering services to maintain or improve their clients' wellbeing (Donabedian, 1988). With the number of filled posts declining for the first time and demand for care further increasing (Skills for Care 2022), there are concerns about the sector's workforce capacity to sustainably meet future demand as well as continue to provide good quality care. Emerging evidence points to pay and contractual conditions as important drivers of labour supply and staff stability (Moriarty et al. 2018, Vadean and Saloniki 2023) as well as care quality (Allan and Vadean, 2023a). Improving pay and other employment conditions would come at increased costs. To justify these, the total benefits to staffing and any additional benefit derived by people supported by services would need to be known. There is, however, limited understanding of the extent to which improving employment conditions, such as increasing wage or improving training opportunities, are effective in improving care outcomes, and particularly for England.

There is a large level of US research on the effect of staffing on resident outcomes (e.g., Konetzka et al., 2008; Boscart et al., 2018; Backhaus et al., 2014; Dellefield et al., 2015). This research has generally looked at staffing factors such as skill mix and staff time within a nursing home. Prior literature on the effect of wages on outcomes has generally examined wage policy effects on employment and pay (Baughman & Smith, 2010; Feng et al., 2010; Wu et al., 2021), although Foster and Lee (2015) also found some improvement in care quality. Further, Ruffini (2022) found evidence that US nursing homes that were located where there was a higher minimum wage had better resident outcomes, but Cawley et al. (2006) found evidence of factor substitution in US nursing homes, with elements of care quality negatively affected by higher pay.

For England, research on the topic is scarce, with emerging evidence showing significant positive associations between better staff retention, (lower) vacancy rates and wage and a care home's overall quality (Allan and Vadean 2021; Allan and Vadean 2023a), whilst employment contract type and level of staffing significantly influence home care provider's overall quality (Allan and Vadean, 2023b).

In this study, we utilise data from an (anonymised) annual survey of people receiving publicly funded care in England. As well as information on personal demographics, health and the type of care they receive, the dataset includes a measure of individual (care) wellbeing, specifically their social care-related quality of life. We link to this dataset information on staffing (e.g. pay, contract type, training) at local authority (LA) level. In England, LAs are the local public councils that have responsibility to provide adult social care services. Using multilevel modelling to account for the clustering of the outcomes data within LAs, we estimate the influence of staffing factors on individual social care-related quality of life, i.e. on individual outcomes. We find some evidence of staffing factors, particularly the average hourly wage of care workers, influencing outcomes positively. We discuss reasons behind this.

This work extends the current evidence base in three ways. First, we are able to look at how staff employment conditions influence outcomes for those receiving home care services. Second, this work extends the evidence for England by examining a direct relationship between staff characteristics and care recipient outcomes; many of the resident outcome measures assessed in the literature to date could be considered as measures of care process, e.g. prevalence of pressure sores. Third, the social care-related quality of life for England has been preference weighted by the general population (Netten et al., 2012), meaning that this measure can be converted into a social care QALY. There is little in the way of a substantive knowledge of quality of life, and valuing this so

as to enable policy makers to make appropriate decisions regarding the allocation of public funds is an important step for research.

The rest of the paper proceeds as follows. The theoretical motivation is outlined before the data used in the analysis is introduced. The empirical specification and econometric issues are then discussed, before the findings of the analysis are presented. Finally, a discussion of the findings and their implications for policy then concludes the paper.

Theoretical considerations

Productivity and quality of care

The textbook definition of a productivity increase in social care is that it would make care cheaper per worker, i.e. current staff can care for more people or fewer staff are required to perform the same number of tasks. However, we assume that any increase in productivity will not only reduce time required for particular care activities but also increase care quality. We therefore consider quality of care to be an element of social care productivity (Yang et al., 2017). Improvements in care quality could, for example, include the availability of new equipment (that staff are appropriately trained to use) which makes a care activity safer or quicker. Nonetheless, we also argue that reducing time taken for care activities will lead to increases in care quality. On this basis, an underlying assumption is that it is not possible to increase the number of people receiving care or reduce staffing (below some minimum level). In the former case, we can consider the short run to be where a provider cannot increase the number of people receiving care. This is particularly the case for care homes given their fixed size. In terms of the latter, for care homes, we specifically assume that there is a minimum staffing requirement and, for home care, that there is a minimum time per visit.[1,2] If there are no reductions in staff, i.e. we can assume that social care providers are already operating at their efficient staffing level, and if the number of people receiving care is not increased, then one result of increased productivity will be more time available between or during tasks. This time can be used for the development of relationships between staff and care recipients, being (more) courteous in exchanges and increasing the trust between the staff member and client (Woodward et al., 2004; Gulliford et al., 2006; NICE, 2019; Ljungholm et al., 2022; Reckrey et al., 2024). It could also be used to reduce the chance of medication errors, ensure care records are correct and kept up to date, to provide time for increased staff communication, improving care coordination, and to maintain staff relationships, which will help with general morale and atmosphere. A second result of increased productivity would be to allow time for tasks to be carried out more often or more carefully. For example, this could include turning a care recipient over in bed more often to reduce further the risk of pressure ulcers or having more time to provide sensitive handling in support of ADLs.

Staffing and quality of care

[1] On staffing in residential care and home care, Section 18 of the Health and Social Care Act 2008 (Regulated Activities) Regulations 2014 states that "[s]ufficient numbers of suitably qualified, competent, skilled and experienced persons must be deployed to make sure that they can meet the requirements [of the regulations]." In practice, providers must have a clear plan as to the staffing levels/mix they have to meet their clients' care requirements.

[2] National institute of Health and Care Excellence (NICE) Home care for older people Quality standard (2016) states that "[o]lder people using home care services have visits of at least 30 minutes except when short visits for specific tasks or checks have been agreed as part of a wider package of support."

Overall, all of the factors discussed suggest that social care productivity increases should influence care quality. Labour economic theory provides the theoretical link between care quality and a number of employment conditions. First, pay could be an important factor determining care quality. Efficiency wage theory provides an explanation for how the wage received by an employee can affect their productivity, and therefore, as argued above, care quality (Salop, 1979; Akerlof and Yellen, 1986; Krueger, 1991). There is evidence at provider level that a higher average wage influences the overall quality rating positively for care homes in England, even after controlling for sector, size, other staffing factors and local area wealth and need levels (Allan and Vadean, 2023a).

Second, training could influence quality of care. Training, whether general or specific, will increase an employee's productivity (Borjas, 2008). Training has been shown to be positively related to performance for UK businesses (Collier et al., 2011). We therefore might expect that training in social care will have a positive influence on quality of care, for example staff learning new methods for helping to perform ADLs or learning how to use new forms of technology which aid care delivery.

Third, the type of contract could also influence quality of care. Whilst the prevalence of zero-hours contracts (ZHCs) is reducing over time (e.g., see Vadean and Allan, 2021), their use can still affect staff. ZHCs add an extra level of stress for employees (Ravalier et al., 2019) and have a negative influence on staff retention (Vadean and Saloniki, 2023). The impact of ZHCs on quality of care could be similar to that of efficiency wage theory, with, a provider moving away from using ZHCs leading to improvements in quality of care from their staff. For example, reducing stress and improving staff retention could have important implications for care continuity (Ljungholm et al., 2021; King et al., 2022; Pereira Gray et al., 2018) and quality (Allan and Vadean, 2023b).

Theoretically, we would expect that there would be a limit to quality of care gains resulting from improvements to pay, training and conditions. For (removing) ZHCs, this would be an isolated (permanent) increase in productivity for an individual employee. For pay and training, gains to productivity should increase at a decreasing rate, i.e. we hypothesise that pay will interact in a non-linear manner with outcomes. For example, emerging evidence finds there are lower wage elasticities at higher wages in the sector (Vadean and Allan, 2023). The reduced likelihood of leaving the role at a higher wage, i.e. less responsive to wage changes, would imply that gains to quality of care due to better retention will become more limited for employees at higher wages. We explore the nature of the relationship between pay and outcomes in the analysis that follows.

Staffing and care outcomes

A formal theoretical model of how care services overall affect the utility of the care recipient has been developed (Forder et al., 2018). Whilst the greater the care support received the greater the (care) utility, this model does not differentiate in the quality of care received. However, as we argue above, for a given level of support, the quality of care will be dependent on the workforce delivering the care (Konetzka et al., 2008; Boscart et al., 2018; Allan and Vadean, 2023). The production of welfare model (Knapp, 1984) directly considers how the service of care providers will influence the quality of life of those receiving care support. In addition to the characteristics of the resident (e.g., needs, age, etc.), resource inputs, including staff and capital (equipment), will affect the quality of a given unit of care (e.g. per hour of home care), which will in turn impact on the care related quality of life of the individual receiving care support.

We used the above arguments around how staff productivity increases will influence quality of care and the production of welfare model as the basis for the empirical analysis of social care-related quality of life.

Methods

Data

For the analysis, we utilised data from the adult social care survey from 2017-2021 (omitting 2020 data when the survey was voluntary for LAs to administer due to the COVID-19 pandemic). The ASCS is an annual survey of adults over the age of 18 whom receive care that is supported or managed by public funds through local authorities (LAs). The survey includes questions around an individual's quality of life and also has information on support setting (home care, residential home, nursing home), age (18-64, over 65), gender (male, female), ethnicity (white, non-white), needs (count of Activities of Daily Living they can independently achieve), self-rated health (five item scale from very bad to very good), primary support reason (physical, sensory, memory and cognition, learning disability, mental health or social) and funding situation (i.e. whether they top-up their public funded support using their own funds). Also included is information on the version of the survey they took (normal or easy read, in English or translated), and whether they required any help answering the questions.

Outcome measure - Social care related quality of life

As outlined in the previous paragraph, the survey includes a measure of care outcomes for individuals. The Adult Social Care Outcomes Toolkit (ASCOT) measure of social care-related quality of life (SCRQoL) asks individuals about how their needs are met by the care they are receiving for eight domains: control over daily life, personal cleanliness and comfort, food and drink, personal safety, social participation and involvement, occupation, accommodation cleanliness and comfort and dignity (Netten et al., 2012). There are four response levels, the ideal state (all needs are met), no needs, some needs, and high needs. This measure of SCRQoL has been anchored through preference weighting so as to be converted into a weighted utility score, with 0 being a value of utility that would be equivalent to being dead. The preference weighted SCRQoL can take a value between -0.171, i.e. a state worse than death, and 1 (Netten et al., 2012). This means that the weighted measure of SCRQoL can be used to estimate a social care quality adjusted life year, i.e. a social care QALY.

Staffing measures

We considered three aspects of staff employment conditions, hourly wage, training and contract type (i.e., ZHCs), which have the potential to be influenced by policy. We matched LA-level average indicator measures of staff quality provided by Skills for Care from the Adult Social Care Workforce Data Set (ASC-WDS). Skills for Care provided staffing information by year, local authority, setting (home care, residential home, nursing home), sector (independent, public) and type of worker (care worker, direct care staff (including care worker), managers and overall). The information available included average hourly pay, training (percentage of staff with relevant social care qualifications) and contract type (percent of workers employed on a ZHC).

To minimise likely differences in staff quality, we matched information for independent sector care workers only to ASCS data by year, LA and setting. We specifically looked at care workers (as opposed to, say, all direct care workers) as we wanted to minimise differences between LAs in staff quality that could be attributable to unmeasured factors, e.g. amount of care time provided by nurses. We believe that care workers are the most homogenous group of workers in adult social care. Nonetheless, given the richness of the ASC-WDS LA-level data, we were further able to include controls for average age, gender (percentage female), nationality (percentage of workforce that is British, as a proxy measure of ethnicity), and average experience in the social care sector.

Controls

Other than the information on topping up their care, there is no specific information on individual wealth. We therefore included a number of controls at LA-level to further proxy for family means, i.e. income/wealth. These were income support uptake, pension credit uptake and house ownership rates. We also controlled for needs related factors at LA-level – percentage living alone by age group, i.e. aged 18-64 and 65+, and Disability Living Allowance (DLA) and Attendance Allowance (AA) uptake. These, plus the further controls of population (density) and local authority adult social care expenditure per person receiving care, were expected to be proxy measures to describe local authority policy. We also included a supply measure, the median wage of all workers in the LA, available from Annual Survey of Hours and Earnings (ASHE) data, as a control for labour market differences between LAs.

Unpaid carers

From the ASCS, there is information on care recipient support through unpaid care by a spouse, relative or friend, i.e. we controlled for differences in outcomes from receiving/not receiving unpaid care. As further controls, we also included LA-level carer related measures using data from the biannual Survey of Adult Carers in England (SACE). We followed previous research (Longo et al., 2023) in the LA-level average carer measures included (i.e. age, sex, ethnicity, carer health needs, economic activity, support received given economic activity, length of caring role, type of support). These LA-level controls were intended to help mitigate any differences that may occur in individual outcomes due to differences in average carer utility between LAs.

Self-funding

Funding source is likely to affect care quality (Forder and Allan, 2014; Grabowski 2004). There is a potential therefore that any staffing effect could be identifying a self-funding effect. A few factors mitigate this. First, the self-funding effect is at provider level and it is unlikely that care staff are providing different quality of care to self-funding clients compared to LA supported ones. For example, a recent study found that there was little evidence of staff being aware of a resident's funding source in care homes (Towers et al., 2021). Nonetheless, a self-funder may be able to afford to receive more care which could improve their outcomes. Although all individuals in the ASCS are in receipt of publicly funded support, some of them were self-funding part of their care through top-ups. Therefore, second, we control for care top-ups in the analysis. Third, we further control for the level of self-funding at LA-level in some estimations, where data is available. In particular, estimates on the percentage of those receiving social care support who are self-funding were available from ONS for 2019 (care homes only) and 2021 (both in a community setting and care homes) (ONS, 2021; ONS, 2022).

Amount of care

We do not have information on the amount of care received, which will impact on care outcomes. For a given budget, increases in cost will mean less time for care. If we did not adequately control for this, we might bias the true relationship between wage and care outcomes. We would expect any bias to be downward (toward zero). To mitigate this potential issue, we assumed that various controls included in the model would act as proxy measures for care receipt. First, individual needs levels would be a direct control for care receipt, given that LA support for care needs is assessed on a needs basis. Therefore, the more ADLs that individuals needed support with, the greater the assumed care receipt. Further, we expected that care top-up will also work as an indicator of (greater) care receipt. We also expected that other individual factors, e.g. age and primary support

reason, may also be indicators of the level of care receipt. (We might expect age to be a much stronger indicator if the age variable was in years or year bands rather than binary age group.) Finally, differences between LAs in care receipt will be (partially) captured by (greater) expenditure of a local authority on adult social care. Every extra pound spent on care at LA-level will be based on either higher aggregated care need (indicating greater care receipt) or higher supply costs.

Empirical model

Based on the conceptual framework above and previous research (Forder et al., 2018; Longo et al., 2021, 2023), we estimated the following model of social care-related quality of life (SCRQoL):

$$SCRQoL_{ij} = \alpha_{ij} + \beta I_{ij} + \gamma A_j + \varphi S_j + \mu_{ij} \quad (1)$$

The SCRQoL of individual i in LA j is dependent on vectors of individual-level measures of needs and personal characteristics, including their receipt of informal care, I, local authority-level measures of policy and demand and supply factors, A, and staffing employment condition measures, S.

Robustness check

There is no measure of the level of care receipt in this model, but as argued above, we anticipated that many of the individual measures of the person receiving care would be indicators of care receipt. As a robustness check to this assumption, we estimated a model where we did not include the measures that were expected to control for level of care receipt. In this case, we expected the influence of employment conditions on SCRQoL to be reduced towards zero.

Hypotheses

Following the conceptual framework, we examined the following hypotheses:

1) Higher (average) hourly pay will increase SCRQoL, but at a decreasing rate as pay increases
2) Higher levels of training will increase SCRQoL
3) Higher prevalence of ZHCs will decrease SCRQoL

Econometric issues

There is likely to be clustering of the outcome measure in this analysis, i.e. individual care-related quality of life will be clustered at LA-level. This implies that there may be factors outside of the model at LA-level which could influence social care-related quality of life. OLS estimation of SCRQoL may then be biased as the observations of care outcomes within each LA may not be independent. In particular, this can create a bias whereby there is a reduction in the size of standard errors in the estimation, which increases the likelihood of significant findings (Moulton, 1990; McNeish & Kelley, 2019; Leyland & Groenewegen, 2020). We therefore employed multilevel models, which allow for the clustering of individuals into LAs within our model.

In particular, we estimated the following version of (1):

$$SCRQoL_{ij} = \alpha_{0j} + \theta_{0j} I_{ij} + r_{ij} \quad (2a)$$

$$\alpha_{0j} = \tau_{00} + \tau_{01}S_j + \tau_{02}A_j + u_{0j} \quad (2b)$$

$$\theta_{0j} = \tau_{10} + u_{1j} \quad (2c)$$

Where the vectors of measures for individual-, local authority- and staffing-level have already been established and u_{0j} and u_{1j} are residuals. The model described in (2) can assess the association of LA average staffing characteristics on changes between LAs' mean SCRQoL (González-Romá, & Hernández, 2023).

We estimated two versions of (2). In the first, we included average hourly pay linearly in the model of outcomes (Model 1) and in the other we included pay quadratically (Model 2). Productivity increases in social care delivery will have a limit, and therefore any influence that pay has on productivity and subsequently outcomes of the care recipient will also be limited. Therefore, we expected that pay would have a concave relationship with outcomes, i.e. outcomes would increase at a decreasing rate as pay rises.

Likelihood-ratio tests of a constant-only model of SCRQoL for each year of 2017, 2018, 2019 and 2021 found that the multilevel model was preferred to the OLS model ($\rho<0.001$ in all four cases). However, the intraclass correlation coefficient is small: Only 1.7-3.1% of the variation in SCRQoL was accounted for by differences between LAs. Therefore, the size of effect of LA-level variables is also likely to be small. We estimated OLS models for each year separately as a specification check.

Given the anonymity of the ASCS, we estimated the model separately for each year as individuals whom may have completed the survey in each year cannot be identified. This would mean that a pooled cross section model utilising data from all years may be biased as unobservable characteristics of individuals cannot be controlled for over the time frame. Nonetheless, noting the potential for bias in these estimates, as a further robustness check we estimated pooled cross-section models to compare the models for individual years. For these models, hourly wages were measured using 2021 prices, i.e. controlling for inflation.

Centering of the model

The primary research interest for this study is the association between the LA-level average staffing quality characteristics and individual outcomes, when controlling for individual and other relevant LA-level characteristics. The staffing measures are higher level variables (level 2) than the outcome measure (level 1). Appropriate methods were therefore employed to identify the true effect of the staffing measures. First, we applied both cluster mean centering and grand mean centering to the data, as uncentered data will tend to bias the results (Algina and Swaminathan, 2011). A bias can be created using level 1 variables (i.e. the individual level factors) as controls when the specific research question is to assess the impact of level 2 variables (Yaremich et al., 2023). It is therefore recommended to use the cluster mean (i.e. LA mean of each level 1 variable) in place of the level 1 variables (Rights et al., 2020). As the individual level variables are all categorical in nature, we used dummy coding to generate cluster means (Yaremych et al., 2023).

In effect, we estimate a 'within-between' model of social care-related quality of life (McNeish & Kelley, 2019). Using this method, we can directly estimate the effect of level 2 variables (in our case the staffing characteristics) on the outcome variable (social care-related quality of life) and when doing so we also control for endogeneity from omitted level 2 variables. The within and between LA

effects of the level 1 control variables are separated out, with the between LA effects being captured by the (level 2) cluster means of the level 1 variables. Note that this method of estimation is analogous to a Mundlak estimation (Mundlak, 1978).

Finally, we used grand mean centering of the level 2 variables. For example, the staffing measures were demeaned using their overall mean in each year: $S_j - \bar{S}$. The use of grand mean centering aids in interpretation of the coefficients and generates a model that is equivalent statistically to the model shown in equation (2) (Algina and Swaminathan, 2011). In particular, the association of LA average staffing characteristics on average SCRQoL is assessed as (standard deviation) changes between LAs from the overall mean value of the staffing characteristic.

Endogeneity of staffing characteristics

As noted above, the use of a 'within-between' model controls for endogeneity from omitted variables (McNeish & Kelley, 2019). However, there may also be simultaneity between the variables of interest and SCRQoL. We would expect, at an individual level, that measures of individual staff quality supporting someone receiving care would be linked to that person's care-related quality of life. The concept of caring and personal relationships is vital to the delivery of care and can lead to staff gaining utility from providing care and support to improve a care recipient's quality of life (e.g. Brown Wilson & Davies, 2009; Brown Wilson et al., 2009; Finfgeld-Connett, 2007; Chana et al., 2015). This could be a reason why there is evidence of a negative pay effect in caring occupations, including social care (Barron & West, 2013). However, our analysis includes measures of staffing at the LA-level. In effect, these measures are a natural (spatial) instrument for individual staff characteristics and should be exogenous of the outcome measure, i.e. not jointly determined. (Ideally, the calculation of the LA average measures for each care recipient would not include the individual staff member(s) that care for them. Nonetheless, given the number of staff employed in social care in each LA is very large, we can assume that the effect of one care worker's staffing characteristics on the LA average would be negligible.) We therefore did not expect that an individual's SCRQoL would have any effect on LA average staff characteristics.

QALY gains and cost per QALY from higher wage

We considered above average (LA-level) care worker hourly wages to be an 'intervention', with the 'control' group implicitly being LAs paying the national average. We further assumed that 'intervention' LAs were in all other aspects similar to LAs in the 'control' group. We computed QALY gains and cost per QALY at £0.25, £0.50, £0.75 and £1 compared to the national average of care worker hourly wages.

With knowledge of the total QALYs and costs for each, we estimated QALY gain and incremental cost effectiveness ratios (ICERs), i.e. cost per QALY, using the following methods. The average QALY (with 95% confidence intervals) for a care recipient at each average hourly wage (national average, +£0.25, +£0.50, +£0.75, +£1) was found from the main analysis. This provided the average QALY gain per care recipient for each intervention when compared to the control. We bootstrapped (100 reps) the per care recipient QALY gain in each instance to provide 95% confidence intervals.[3] We

[3] We might also consider the length of the effect on care outcomes. If the pay rise is permanent, the theoretical efficiency wage model would assume that the productivity gain is also permanent. One would then need to know an appropriate length of time of care receipt to estimate the total QALY gain for an individual, appropriately discounted to its net present value. We do not do this for two primary reasons. The first is that there is no data on average length of care receipt for those using home care. For care homes, there is some (older) evidence on length of stay ((Forder and Fernandez, 2011; Steventon and Roberts, 2012) and life

estimated the total QALY gain for each increment above national average by care setting (i.e. all, home care and care homes) using official Short and Long Term Support (SALT) collections data on the average number of people receiving publicly-funded long-term adult social care support per LA. For example, on 31 March 2019 there were 4,186 people (1,259 care home residents and 2,927 people living in their own homes) receiving publicly-funded long-term support in the average LA (NHS Digital, 2019).[4]

Wage costs were determined using LA workforce data. We ignored the issue of care workers working for different providers and additional costs to employers of pay increases (e.g. National Insurance and pension contributions, wage increases for other workers to maintain pay differentials). For example, in 2018/19, there were 3,143 FTE care workers in the average LA (1,665 working in care homes and 1,478 working in home care).[5] We then calculated the cost per person of each intervention. The ICER was then calculated as the difference in (wage) cost per person divided by the difference in QALY per person between intervention and control LAs. Whilst in reality the differences in average pay, i.e. the 'interventions', were unique to specific LAs, given our assumption in estimating QALY gains that the LAs in the intervention are in all other ways equal, we compared across the interventions as to which intervention was more cost effective (assumed comparability).

Results

Descriptive statistics

Descriptive statistics for variables included in the analysis are presented in Table 1. Individual care recipient variables from the ASCS are presented along with average values within the dataset of LA-level variables, which are presented for information. From 2017 to 2021, there have been significant increases in the proportion of people: receiving support in a community setting, receiving support primarily for physical needs, whom are paying for top-up care, are in poorer health, are aged 18-64 and whose ethnicity is not white ($\rho<0.01$). The level of informal care receipt significantly fell between 2017-2019 and 2021 ($\rho <0.05$). As the data is anonymised and we are not following respondents over time, in all cases, the differences reported could reflect changes to the survey respondents who provided complete data rather than actual changes to the population receiving care support.

Table 2 reports the changes to average care worker characteristics over time, by care setting. As expected, given the increase in national living wage over the period examined (from £7.50 to £8.91), average hourly pay of care workers has increased rapidly. The increase in each care setting is slightly above the rate of the National Living Wage increase, with nursing home average pay increasing by £1.60 per hour. Those working in residential homes had the lowest increase over time (£1.51 per hour). For home care staff, we tend to observe higher average hourly pay. This is most likely due to

expectancy (ONS, 2023) that could be used. The second reason is that the cost per QALY would not change as both the QALY gain and cost factors would increase by the same factor of time.

[4] This also assumes that all people receiving support in their own homes were in receipt of home care supported by staff. This will be an overestimation as some will be supported in other ways, e.g. home adaptations and equipment. Additionally, some direct payment users will use (some or all) their budget for care support to employ personal assistants (PAs). We might expect a similar theoretical argument of pay and conditions impacting on PA productivity. To date, there is a much smaller evidence base on the employment of PAs (e.g. Woolham et al., 2019; Roland et al., 2021; Gousia and Allan, 2024).

[5] We assumed that FTE was equal to 37.5 hours.

at least some employers paying a higher hourly wage but only paying their staff for contact time and not for travel time between clients (Vadean & Allan, 2023; Patmore, 2004).

ZHCs are more prevalent in home care settings, but this is on a declining trend. For care homes overall, their use has remained fairly stable, although with a slight fall for nursing homes. The proportion of staff with a relevant social care qualification has fallen over time, as has the proportion of staff that are British. Nursing homes have a much lower proportion of staff that are British. The proportion of staff that are female has remained fairly stable, and, whilst average experience of care workers in the social care sector has increased, the average age of care workers has been increasing at a faster rate. Whilst this provides some support to improving retention within the sector, it also may indicate that turnover is still a problem, and potentially increasingly so for those of a younger working age.

Findings

Quality of life models

Results for the models of quality of life are presented in Tables 3-7 and Figures 1-3. Given the likely combined factors that are included in various individual- and LA-level controls, we do not report the estimates for these in the main findings as their interpretation would be difficult. Tables 3 and 4 present the staffing characteristics findings for both Models 1 and 2 of SCRQoL when estimated for each year of 2017, 2018, 2019 and 2021, respectively, with the former including average hourly pay linearly in the model of care outcomes and the latter quadratically. We also include the findings when all years are pooled together in these two tables, again noting the potential bias that could arise from observations in different years being of the same person that we could not identify. There was a significant positive relationship between pay and care outcomes for 2018 and 2021 in model 1 (Table 3), the latter including a control for self-funding levels by care setting. The findings for model 2 (Table 4) suggest that, overall, there would appear to be some indication of a quadratic relationship between care outcomes and LA-level care worker average hourly pay. However, the quadratic effect is opposite to that expected *a priori*, with outcomes reaching a minimum before increasing. The significant positive effect of wages is also apparent in the pooled cross section models.

The results for both models 1 and 2 find that LAs with higher average hourly pay tend to have better outcomes. For model 1, each standard deviation above the mean LA average hourly pay of care workers increased average care outcomes for these higher paying LAs by 0.008 (1.0%) and 0.009 (1.2%) for 2018 and 2021, respectively (see Figure 1). For the models including average hourly pay quadratically, see Figure 2 and Table 5. The negative influence of average hourly pay at LA-level is particularly strong for 2017 but not for other years. Again, the size of the influence for any year is relatively small. For example, in 2021, LAs with average hourly pay of care workers two standard deviations above the average LA have care outcomes that are 0.027 (3.6%) higher, on average. We also find for the pooled cross section that the size of effect is smaller than for individual years. The LA with hourly wage two standard deviations above the average LA has care outcomes that are 0.014 (1.8%) higher, on average.

Figure 3 presents the change in average SCRQoL for changes in the proportion of care workers in an LA that are employed on a ZHC for Model 2. There is some evidence of an association between higher proportion of care workers on ZHCs and poorer outcomes, particularly in 2019 and 2021 (the latter for Model 2 only). In Model 1 for 2019, an LA with a one standard deviation higher proportion of staff employed on ZHCs (from 0.677 compared to 0.417) had significantly poorer outcomes that

were 0.016 (2.1%) lower on average. We found minimal evidence that social care qualification prevalence amongst care workers had any association with care outcomes. There was some indication of a significant negative association between proportion of care workers that were British and care outcomes for 2019, 2021 and the pooled crossed section, and in the same individual years a significant association between average care worker age and care outcomes, but with differing directions of influence.

Table 6 presents the findings for estimating Model 2 by care setting for each year of 2017, 2018, 2019 and 2021. These show differences by care setting, with those receiving support in their own home having their outcomes more significantly affected by the characteristics of staff (age, nationality). For home care, the significant negative effect of increasing hourly pay to the average level is found for not only for 2017, but also for 2018 and 2019. For care homes, the significant negative effect of increasing hourly pay to the average in 2017 is still apparent, and it also is found for 2021. For 2018 and 2019 the quadratic relationship is that which was expected *a priori*, i.e. increasing at a decreasing rate. Only for 2019 are the differences in outcomes significantly greater as pay increases, and only between those LAs paying below average pay compared to average pay. For 2019, at 2 standard deviations above average hourly pay (around £0.64 per hour) care outcomes are lower than the average LA, but not significantly. Finally, for care home residents in 2017 and 2018 there is a positive influence of staff working on a ZHC. A potential explanation for this opposite to expected finding is potentially that care homes may be able to more efficiently allocate staff time (and costs) across a working day/week, thereby improving resident outcomes on average.

Table 7 presents the specification check when estimating Model 1 using OLS with the original control variables in their original form, i.e. uncentered. The results are generally very similar to those presented in Table 3. As a further robustness check, we estimated the pooled cross section regression for Model 1 when not including the controls which were indicators of care receipt. We found, as expected, a weaker estimated coefficient of 0.003 which was not significantly different from zero (ρ=0.659).

QALY gains and cost per QALY

Table 8 presents the descriptive statistics of publicly-funded long-term care recipients and FTE care workers for the average LA, by year. The number of care recipients has fallen over time, with the average LA supporting 186 (4.4%) fewer people. The number supported residing in care homes has fallen (7.7%) to a greater extent than those receiving support at home (3.0%). The number of FTE care workers has increased over time, with the average LA having 77 (2.4%) more care workers in 2021 compared to 2017. However, this increase is seen solely in home care, with the average LA having 152 (10.3%) more care workers in the community, with a reduction in those working in care homes for the average LA of 75 (-4.5%).

Table 9 presents estimated cost and effects for a LA that has higher average pay for their care workers across all settings. The estimated QALY, QALY gain, cost difference and ICER are for increments of £0.25, £0.50, £0.75 and £1 per hour in LA-level average care worker pay above the national average and are presented for each year of 2017-2019 and 2021. The average QALY for a care recipient by average wage of care worker are predicted using Model 2, i.e. adjusting for controls and with pay having a non-linear relationship to outcomes. QALY gains are provided from bootstrapped estimates (100 repetitions) of the difference in average QALY by average hourly wage of care workers. QALY gains were statistically significant only for 2018 (0.013 at £0.50 per hour increment) and 2021 (0.015).

The cost of intervention, i.e. wage increase, is always increasing in wage within each year. Given the reduction in number of publicly-funded care recipients and increase in care workers for the average LA, the cost per publicly-funded person of interventions increased over time. For example, the cost per care recipient of the £0.50 per hour intervention increased by £52.09 (7.2%) between 2017 and 2021.

Finally, using the cost per person of the interventions and the difference in outcomes for the average care recipient, we estimated the ICER at LA-level for 2017-19 and 2021. We only present these where the intervention leads to an increase in average QALY (i.e., where the intervention is not dominated). The findings suggest that the higher the average hourly wage the more cost effective the intervention, i.e. that outcomes increase to a greater degree than costs. For example, for 2021, the cost per QALY varies from £36,000 to £68,000 as the LA average wage reduces. The pooled cross section model suggests a cost per QALY of £116,000 for an hourly wage of £1 above average to £140,000 for an hourly wage of £0.25 above average.

Tables 10 and 11 present the estimated costs and effects of above average care worker pay when split by care setting. The QALY gain estimated from home care models for an intervention is generally positive although not significantly different from zero. For 2018 there is a significant average QALY gain for an hourly pay of £0.75 and £1 above average, with an estimated ICER of £17,000 and £12,000, respectively. In the pooled cross section model for home care, all interventions lead to significantly higher QALY and the ICER for interventions range from £53,000 to £82,000. For the care home residents only model, generally the interventions are dominated or have a very high ICER. The only significant differences in outcomes is for 2017/18, and specifically at £0.75 and £1 above average hourly pay. This provides ICER estimates of £53,000 and £32,000, respectively. In the pooled cross section model, all interventions are dominated.

Discussion

There are currently high levels of turnover and job vacancies in adult social care in England and (local and national) government policy could be used to try to improve retention and increase employment. Whilst there is naturally a cost to any such policy, e.g. a pay increase, there may also be further knock-on benefits above and beyond the impact on staffing, such as improvements in the outcomes of those being supported by care services. For example, there is a growing evidence base of the effect that higher pay have on care quality and retention (Allan & Vadean, 2023a; Baughman & Smith, 2012; Foster & Lee, 2015; Vadean and Saloniki, 2023). To date, however, the size of effect on outcomes of higher pay and/or better conditions has not been quantified for England.

Given this context, this study looked to assess the relationship between staffing pay and conditions and the care outcomes of individuals in receipt of social care. We used data from Adult Social Care Survey and matched to this staffing information at LA-level. Controlling for individual personal characteristics, informal care as well as economic and staffing factors at LA-level, we found evidence of a significant relationship between pay and care outcomes. The size of association was relatively small, with average care outcomes being around 2-3% higher in an LA with a two standard deviation higher wage compared to the average. The identified quadratic relationship was opposite to that expected, with evidence for certain years of higher cared for persons' quality of life being associated with lower care worker pay.

Using the predicted outcomes for the average resident in LAs with above average hourly wage, we estimated QALY gains. Keeping everything else equal, we estimated ICER (cost per QALY) for differences in LA average hourly care worker pay of £0.25, £0.50, £0.75 and £1 above the national

average. Overall, there was a very wide confidence range for the marginal effects of pay on care outcomes. Cost per QALY estimates were significant for 2018, 2021 and for the pooled cross section model across all years. In 2018 cost per QALY ranged from £44,000 to £67,000 depending on the size of pay increment considered. The pooled cross section provided higher ICER than the estimates for individual years for each increment of hourly pay above average, ranging from £116,000 for £1 per hour to £140,000 for £0.25 per hour. When looking by care setting, there was very limited evidence of significantly higher outcomes from higher wages, particular for care home only models. For home care, the pooled cross section model suggested that higher pay was QALY improving, with ICER ranging from £53,000 to £82,000. In terms of the quantifying these figures, HM Treasury guidance sets the monetary willingness to pay for a QALY at £70,000 (HM Treasury, 2022).

Efficiency wage theory suggests a number of mechanisms through which higher pay will improve productivity, such as less shirking of responsibilities, reduced turnover and better morale (Akerlof & Yellen, 1986; Katz, 1986; Salop, 1979; Stiglitz, 1982). Whilst further research would be required to assess the specific mechanisms through which improved pay and conditions impact on care outcomes, the findings of this work offer some initial evidence. In terms of less shirking and lower staff turnover, for some models we found that the average individual receiving community support had a significantly higher level of outcomes living in a LA with a given higher average hourly wage. Whilst there is some difficulty to observe the quality of effort of staff in social care, when compared to the delivery of care in care homes, care workers working in home care will be delivering care on their own (in the main), with less in the way of direct supervision. This will offer a home care worker greater opportunity to 'shirk' their job responsibilities. Further, there are a greater level of vacancies in home care than for those working in care homes, suggesting there could be a greater opportunity to use wage as a tool to attract staff (Skills for Care, 2023). Recent evidence has found that the home care part of the LTC sector may have a higher wage elasticity to recruitment than compared to care homes, although this is subject to data quality issues regarding pay in home care (Vadean et al., 2024). For care homes, that LAs paying the mean average hourly pay had better outcomes on average could be an indication of factor substitution found in previous studies (Cawley et al., 2006). However, we have previously found a positive wage effect on quality at care home level (Allan and Vadean, 2023a). Therefore, further work is required to examine how staff pay and conditions influence resident outcomes.

Higher wages also have a positive effect on staff retention (Baughman & Smith, 2012; Vadean & Saloniki, 2023). Given the importance of relationships in the provision of social care, greater staff retention should improve continuity of relationships between carer and the person they are supporting, which should have a positive effect on outcomes (Reckrey et al., 2024). Future research is required to investigate the longitudinal impacts of changes in pay for adult social care staff on care outcomes.

There was also some evidence of a significant negative relationship between the prevalence of ZHCs and care outcomes, although it was not found for all years or in pooled cross section models. ZHCs can put additional pressures on employees (Ravalier et al., 2019), offering support to higher staff morale improving productivity. A further lever to improved productivity is that ZHCs also have a negative impact on staff turnover (Vadean and Saloniki, 2023). The evidence found here of a negative association on individual care outcomes supports findings of a negative association between ZHC prevalence and home care provider quality ratings (Allan and Vadean, 2023b). There may be implications of weaker contracts for staff which need to be carefully considered by providers and local and national government.

We found no evidence of a significant effect of social care qualifications on SCRQoL. This may be indicative of a lack of rewards in social care to experience (also an insignificant effect in the estimated models) and qualifications. However, the effect of experience/qualifications could be partly explaining the significant effect of higher wages; there is evidence of significant positive influence of experience and qualifications on care worker pay, although alongside a negative influence of training (Vadean and Allan, 2023). It could also reflect the data used in the analysis, which focussed on care workers only to limit worker heterogeneity. The effect of experience and qualifications may be better reflected with an analysis of a wider spectrum of the social care workforce. More research using more granular data is required on the effect of staff experience, training and education on quality of life.

We found initial evidence that some of the controlling staffing factors had an influence on social care outcomes, particularly age, gender and nationality. In terms of the latter, ethnicity could affect social care outcomes through mismatches in the preferences of the person requiring support to the carer(s) providing the support. Racism is one reason for this, which can be dealt with in time if appropriately managed (Stevens et al., 2010; Shutes & Walshe, 2012), but this could also be for practical reasons. For example, there can be difficulties with communication because of language reasons (Butt and O'Neil, 2004; Manthorpe et al., 2012; Shutes & Walshe, 2012). If a person requiring support is unable to explain their needs clearly then this could have a negative effect on their outcomes. Although only tentative given the level of analysis, this finding could be important for employment policy in social care. The migrant care workforce has increased greatly in the last years, from 240,000 (16% of filled posts) in 2021/22 to 395,000 (25% of filled posts) in 2023/24 (Skills for Care, 2024).

Similarly, there could be gender or age preferences to care receipt. The large majority of care staff are women, and sometimes people have a preference as to which gender they are receive care from, e.g. not wanting to receive care from someone of the opposite gender (Shutes & Walshe, 2012; Perone, 2023; Braedley et al., 2018). Age also plays a role in sector composition and there may be preference to the age of a care worker (Shutes & Walshes, 2012). The findings of this analysis suggest that further investigation is required around the effects of protected characteristics of care staff on the outcomes of care recipients.

Limitations

There are a number of limitations to this analysis. First, staffing data was only available at LA-level and individual outcomes data is not longitudinal. The disadvantage of the former is that care outcomes at the individual level will be affected by the staff that provide the care, and as such the analysis may not capture the full effects that staff with better pay and conditions have on the care outcomes of individuals. However, staffing factors at the individual recipient level would likely to be endogenous to care outcomes. The LA-level staffing data, being at a higher (spatial) order to the individual outcomes data, is an ideal instrument for staffing factors at the individual level. As to the latter, having access to individual outcomes data over time would allow for more refinement in analyses which would strengthen the evidence base for policy. Overall, further analysis would be required with staffing data at the individual care recipient level to be able to determine the validity of a) the findings from this analysis and b) LA-level staffing data as an instrument for staffing at care recipient level.

Whilst the analysis used data on those receiving publicly-funded care, there is likely to be some self-funding effect that we needed to control for in the analysis. To a large degree, we believe we have been able to effectively do this, with the inclusion of care top-up information and, for later years,

controls for the proportion of self-funding by type of care at LA-level. As discussed above, there is likely to be a wall between cost of care and care receipt, whereby those staff providing the care do not worry (and also likely do not know) whether the person is self-funded or not. This would particularly be the case in care homes (e.g., see Towers et al., 2021).

Therefore any self-funding effect on the findings is most likely to be felt with greater care receipt, i.e. you can afford more support. This is a key consideration of the analysis and is a possible limitation to findings. We attempted to control for care receipt to a large degree, with a number of controls included in the model likely to factor into the level of care receipt. The number of ADLs performed independently were included in the model, and publicly-funded care is assessed on both a needs and financial basis. We also believed that primary support reason and age of the individual would affect the likelihood of care receipt and potentially the amount. Finally, at LA-level, we also controlled for the level of adult social care expenditure, which will be affected by both cost and amount of care.

A further limitation to this study is that we cannot assess how higher pay has been achieved in certain LAs. We have utilised the most homogenous group of staff in adult social care, care workers, and controlled for a number of personal and job-level characteristics for staff at LA-level, i.e. age, gender, nationality, experience and qualifications. There will be cost-of-living differences between regions and LAs, for example staff living in London compared to the North East. We have controlled for the overall median wage in LAs and also included other controls that could be seen as suitable for financial differences, e.g. household composition, income support uptake. Therefore, the analysis has controlled, at least to some degree, for any differences in wages between LAs not attributable to employer or policy decisions. Nonetheless, further investigation is required using longitudinal analysis to assess pay effects on care outcomes and to assess what is causing the higher pay. For example, is it providers paying higher wages of their own volition or is this evidence of wage pass-through policies at LA-level? Research of LA wage policies on care staff would be a good next step to this analysis.

Finally, the cost-effectiveness analysis utilised a strong assumption that LAs with higher average hourly wage for care workers were otherwise equal to the average LA. This enabled ICERs to be estimated and comparison of interventions. We found, generally, that cost per QALY estimates decreased as the pay difference increased. We expect though that productivity gains would decrease with wages. This could be because of the level of analysis, i.e. there is a limited distribution of average care worker wage at LA-level. Moreover, given the wide confidence intervals for the marginal effects of pay on care outcomes and the assumptions made, there is also limited confidence in the cost per QALY estimates. The estimates also do not take into account the effect of wage increases on staffing levels and stability, any effect on self-funders (who are likely to be supported by the same staff in the majority), nor fully consider all costs borne by employers. Nonetheless, we believe the estimates provide a first quantifiable indication as to the extent that staff pay and conditions can change care outcomes, increasing the evidence base for adult social care in England. In terms of future research, a full cost-effectiveness analysis could, for example, be achieved by assessing the differences in individual outcomes for a wage pass-through policy by a LA in comparison to a control LA where no policy was implemented.

Many directions for future research have already been outlined. In addition, research could also explore whether there is a stronger association of employment conditions on higher-order domains of social care, e.g. occupation and control, than basic domains, e.g. personal cleanliness and food and drink. We might anticipate that in general basic care tasks will be achieved by all care providers, but that if staff have better employment conditions they are empowered to achieve more in the

higher order domains. Finally, future research could also explore if there has been a change in the relationship between employment conditions and social care outcomes pre- and post-covid, and to what extent.

Conclusion

This study looked to assess the association that pay and conditions have on social care-related quality of life of those in receipt of publicly-funded care using data for 2017-2021. We found some evidence that pay and conditions have significant influence on the outcomes of care recipients. We quantified this relationship, estimating the cost effectiveness of higher pay for care workers. The estimates are based on a number of important assumptions given that staffing data was only available at LA-level. Nonetheless, the estimates of cost per QALY of higher pay are the first evidence for England and will help to aid policy decisions. Future research should look to assess the relationships between pay and conditions and social care outcomes using more granular staffing data, where possible.

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Table 1: Descriptive statistics

	2017	2018	2019	2021
Care recipient level				
Social Care Related Quality of life	0.781	0.778	0.777	0.749
	(0.209)	(0.213)	(0.214)	(0.224)
Primary support reason (Physical = 0 / Other = 1)	0.231	0.229	0.209	0.204
	(0.422)	(0.420)	(0.407)	(0.403)
Independent ADLs (0-7)	3.62	3.56	3.58	3.62
	(2.22)	(2.20)	(2.19)	(2.22)
Top-up care (No = 0/ Yes = 1)	0.413	0.417	0.418	0.425
	(0.492)	(0.493)	(0.493)	(0.494)
Health (Very bad = 1 to 5 = Very good)	3.09	3.07	3.08	3.01
	(0.99)	(1.00)	(0.99)	(1.01)
Informal care (No = 0 / Yes = 1)	0.848	0.849	0.849	0.842
	(0.359)	(0.358)	(0.358)	(0.365)
Ethnicity (White = 0 / Not white = 1)	0.104	0.110	0.101	0.114
	(0.306)	(0.313)	(0.301)	(0.318)
Age (18-64 = 0 / 65+ = 1)	0.749	0.753	0.756	0.733
	(0.434)	(0.431)	(0.430)	(0.422)
Gender (Male = 0 / Female = 1)	0.668	0.664	0.667	0.662
	(0.471)	(0.472)	(0.471)	(0.473)
Support setting: Residential care home (ref Community)	0.234	0.247	0.232	0.145
	(0.424)	(0.431)	(0.422)	(0.352)
Support setting: Nursing care home (ref Community)	0.074	0.073	0.086	0.048
	(0.262)	(0.260)	(0.280)	(0.214)
Question help (No = 0 / Yes = 1)	0.888	0.888	0.875	0.858
	(0.316)	(0.315)	(0.331)	(0.349)
Easy read survey (No = 0 / Yes = 1)	0.113	0.095	0.099	0.106
	(0.317)	(0.293)	(0.298)	(0.308)
Survey translated (No = 0 / Yes = 1)	0.0004	0.0016	0.0009	0.0012
	(0.0204)	(0.0404)	(0.0292)	(0.0340)
LA-level				
Care workers				
Average hourly pay	8.07	8.39	8.78	9.68
	(0.35)	(0.37)	(0.33)	(0.37)
Proportion with Zero-Hours Contract	0.451	0.427	0.417	0.475
	(0.277)	(0.267)	(0.260)	(0.241)
Proportion with social care qualification	0.479	0.479	0.455	0.409
	(0.122)	(0.115)	(0.115)	(0.113)
Proportion British	0.832	0.841	0.827	0.834
	(0.140)	(0.133)	(0.140)	(0.135)
Proportion female	0.853	0.852	0.851	0.851
	(0.041)	(0.046)	(0.044)	(0.047)
Average age	41.47	41.91	42.41	42.92
	(1.75)	(1.84)	(1.91)	(1.99)
Average social care experience	6.73	6.90	7.06	7.18
	(0.96)	(0.87)	(0.92)	(1.02)
Local demand and supply factors				
Public LTC expenditure per user (000s)	21.90	22.93	24.52	26.67
	(4.09)	(3.92)	(4.23)	(4.99)
Median hourly wage, all workers	13.46	13.73	14.15	14.94
	(2.08)	(2.13)	(1.52)	(1.77)
Self-funding (%)*			35.36	32.52
			(11.95)	(10.35)
Pension credit uptake (%)	17.16	13.12	15.06	13.30
	(7.33)	(5.89)	(6.22)	(4.84)

Income support uptake (%)	1.18 (0.46)	1.02 (0.43)	0.72 (0.31)	0.43 (0.20)
Attendance allowance uptake (%)	12.42 (2.20)	12.28 (1.84)	12.01 (1.71)	11.55 (1.61)
Disability Living Allowance uptake (%)	7.19 (2.97)	6.31 (2.70)	5.57 (2.46)	4.62 (1.93)
Population density per 10,000 people	0.219 (0.266)	0.220 (0.268)	0.200 (0.277)	0.194 (0.199)
One per household, 18-64 (%) (Ref >1 per household, 18-64)	17.80 (3.18)	18.02 (3.48)	17.68 (3.13)	17.70 (3.26)
One per household, 65+ (%) (Ref >1 per household, 65+)	12.32 (2.12)	12.30 (2.05)	12.40 (1.93)	12.48 (1.62)
House owned (%)	63.71 (10.39)	63.69 (10.32)	64.19 (9.50)	64.76 (8.36)
Informal unpaid carer characteristics				
Carer ethnicity: Not white (%) (ref White)	11.51 (18.23)	11.84 (17.93)	11.35 (17.29)	12.31 (15.95)
Carer ethnicity: Not available (%) (ref White)	5.72 (9.45)	10.79 (15.18)	10.77 (15.38)	10.55 (10.98)
Carer age 65+ (%) (Ref 18-64)	45.68 (9.18)	45.59 (9.13)	46.03 9.27	43.87 (8.78)
Carer female (%) (Ref Male)	68.52 (2.97)	68.78 (3.09)	68.64 (3.15)	69.45 (3.45)
Carer with long-standing illness (%)	28.77 (3.66)	30.01 (3.95)	29.69 (4.07)	29.23 (4.05)
Carer with physical impairment (%)	20.48 (3.40)	20.08 (3.48)	20.06 (3.44)	19.68 (3.38)
Carer with sight or hearing loss (%)	16.68 (2.83)	16.74 (3.47)	16.90 (3.39)	16.10 (3.47)
Carer employed (%)	18.39 (4.22)	18.31 (4.34)	18.45 (4.36)	20.26 (4.91)
Carer retired (%)	57.82 (8.29)	56.77 (8.04)	57.06 (8.01)	55.99 (8.09)
Carer self-employed (%)	4.89 (1.88)	5.12 (2.01)	5.21 (2.06)	5.38 (2.19)
Carer unemployed (%)	21.28 (4.48)	21.62 (5.44)	21.63 (5.03)	20.67 (4.14)
Carer with financial problems because of caring role (%) (ref No financial problems)	49.29 (5.89)	47.75 (6.84)	47.65 (6.62)	43.31 (7.02)
Carer does not live with care recipient (%) (ref Carer lives with recipient)	24.22 (7.63)	22.13 (6.81)	22.15 (6.92)	23.73 (8.77)
Caring 0-6 months (%)	0.60 (0.67)	0.41 (0.37)	0.45 (0.45)	0.56 (0.66)
Caring 6-12 months (%)	2.37 (1.17)	2.24 (1.43)	2.30 (1.42)	2.64 (1.57)
Caring more than a year (%)	97.03 (1.46)	97.36 (1.59)	97.26 (1.66)	96.79 (1.86)
Carer not working because of caring responsibilities (%)	21.69 (7.12)	23.37718 6.988167	22.64 (6.01)	21.97 (5.59)
Carer self-employed but unable to balance work and caring role (%)	1.45 (0.84)	1.66 (1.06)	1.73 (1.07)	1.66 (1.01)
Carer in paid work but do not feel supported by employer (%)	3.66 (1.41)	(3.58) (1.52)	3.60 (1.55)	3.86 (1.69)
Carer provides personal care (%)	68.90 (6.67)	70.32 (5.35)	70.42 (5.14)	69.79 (6.05)
Carer provides physical help (%)	58.13 (6.22)	58.93 (5.04)	58.98 (4.94)	57.40 (6.39)

Carer provides other practical help (%)	92.40 (2.87)	92.19 (10.43)	92.35 (9.16)	92.70 (3.40)
Carer provides help with medicines (%)	77.02 (5.19)	78.91 (5.00)	78.76 (4.98)	77.12 (6.35)
Carer provides emotional support (%)	83.99 (3.37)	85.28 (3.34)	85.14 (3.37)	84.98 (3.21)

Notes: *Self-funding data available for care homes only in 2019.

Table 2: Average LA-level characteristics of care worker staff, by support setting

Staff characteristic	Setting	2017	2018	2019	2021
Average hourly pay	Non-residential	8.21 (0.42)	8.54 (0.41)	8.93 (0.39)	9.78 (0.40)
	n	144	146	146	148
	Residential care home	7.94 (0.35)	8.25 (0.32)	8.62 (0.32)	9.45 (0.28)
	n	146	143	143	144
	Nursing care home	7.79 (0.26)	8.12 (0.23)	8.50 (0.26)	9.39 (0.28)
	n	134	133	127	136
Proportion with Zero-Hours Contract	Non-residential	0.602 (0.185)	0.592 (0.194)	0.589 (0.183)	0.575 (0.192)
	n	129	132	130	136
	Residential care home	0.116 (0.060)	0.110 (0.053)	0.108 (0.054)	0.113 0.055
	n	149	148	147	147
	Nursing care home	0.100 (0.060)	0.096 (0.057	0.090 (0.046)	0.094 (0.053)
	n	145	147	145	147
Proportion with social care qualification	Non-residential	0.455 (0.114)	0.450 (0.114)	0.419 (0.115)	0.403 (0.115)
	n	146	148	147	150
	Residential care home	0.566 (0.114)	0.550 (0.116)	0.535 (0.120)	0.486 (0.141)
	n	141	143	140	149
	Nursing care home	0.494 (0.182)	0.486 (0.189)	0.485 (0.173)	0.434 (0.176)
	n	143	148	146	145
Proportion British	Non-residential	0.844 (0.141)	0.845 (0.137)	0.838 (0.140)	0.828 (0.137)
	n	138	139	141	145
	Residential care home	0.826 (0.155)	0.824 (0.152)	0.822 (0.150)	0.806 (0.168)
	n	132	132	128	135
	Nursing care home	0.748 0.177	0.754 (0.181)	0.741 (0.187)	0.733 (0.187)
	n	117	119	119	132
Proportion female	Non-residential	0.855 (0.043)	0.855 (0.043)	0.855 (0.041)	0.851 (0.048)
	n	149	149	148	151
	Residential care home	0.850 (0.054)	0.855 (0.051)	0.854 (0.052)	0.845 (0.058)
	n	148	147	145	148
	Nursing care home	0.876 (0.043)	0.881 (0.038)	0.881 (0.038)	0.866 (0.047)

	n	148	148	146	149
Average age	Non-residential	41.98	42.45	42.92	43.49
		1.56	1.69	1.85	1.87
	n	148	148	147	149
	Residential care home	41.05	41.50	42.11	42.60
		2.23	2.30	(2.50)	(2.64)
	n	143	143	143	146
	Nursing care home	39.72	40.11	40.67	41.19
		(2.12)	(2.02)	(2.03)	(2.26)
	n	146	146	145	145
Average social care experience	Non-residential	6.37	6.56	6.69	7.04
		(1.02)	(0.85)	(0.91)	(0.96)
	n	149	149	150	151
	Residential care home	7.63	7.70	7.90	8.20
		(1.00)	(0.96)	(1.02)	(1.12)
	n	149	149	148	147
	Nursing care home	6.87	7.02	6.98	7.42
		(0.94)	(1.06)	(1.06)	(1.20)
	n	148	148	146	149

Table 3: Model 1 results of estimation of social care related quality of life model, by year

	2017	**2018**	**2019**	**2021**	**Pooled**
Setting: All					
Average hourly pay	-0.003	0.022**	0.005	0.026**	0.011**
	(0.009)	(0.010)	(0.013)	(0.010)	(0.005)
Proportion with Zero-Hours Contract	-0.016	-0.005	-0.063***	-0.028	-0.004
	(0.018)	(0.018)	(0.023)	(0.018)	(0.011)
Proportion with social care qualification	-0.017	0.002	-0.011	0.034*	0.010
	(0.025)	(0.020)	(0.023)	(0.020)	(0.011)
Proportion British	-0.043	-0.032	-0.135***	-0.039	-0.048***
	(0.030)	(0.024)	(0.038)	(0.027)	(0.017)
Proportion female	0.065	-0.042	0.077	-0.076*	-0.035
	(0.049)	(0.049)	(0.053)	(0.045)	(0.026)
Average age	-0.0003	-0.002	0.006***	-0.003*	0.0002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
Average social care experience	0.00001	0.002	-0.003	-0.003	-0.001
	(0.003)	(0.003)	(0.004)	(0.003)	(0.002)
n	11,631	11,906	10,251	11,729	45,726

Notes: Multi-level models of social care related quality of life. Models include all control variables listed in Table 1 at individual and LA level. Percentage self-funding their care at LA-level only included in 2021 model. Standard errors are clustered by LA.

Table 4: Model 2 results of estimation of social care related quality of life model, by year

	2017	2018	2019	2021	Pooled
Setting: All					
Average hourly pay	-0.016	0.018*	-0.004	0.016	0.010*
	(0.010)	(0.011)	(0.014)	(0.010)	(0.005)
Average hourly pay squared	0.036***	0.015	0.036*	0.027**	0.003
	(0.013)	(0.014)	(0.020)	(0.011)	(0.004)
Proportion with Zero-Hours Contract	-0.014	-0.008	-0.068***	-0.032*	-0.004
	(0.017)	(0.018)	(0.022)	(0.018)	(0.011)
Proportion with social care qualification	-0.023	-0.002	-0.014	0.028	0.010
	(0.025)	(0.021)	(0.023)	(0.020)	(0.011)
Proportion British	-0.025	-0.038	-0.142***	-0.049*	-0.049***
	(0.032)	(0.024)	(0.037)	(0.027)	(0.017)
Proportion female	-0.016	-0.041	0.073	-0.081*	-0.034
	(0.058)	(0.049)	(0.053)	(0.045)	(0.026)
Average age	0.0004	-0.002	0.005**	-0.003*	0.0002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
Average social care experience	-0.001	0.002	-0.002	-0.003	-0.001
	(0.003)	(0.003)	(0.004)	(0.003)	(0.002)
n	11,631	11,906	10,251	11,729	45,726

Notes: Multi-level models of social care related quality of life. Models include all control variables listed in Table 1 at individual and LA level. Percentage self-funding their care at LA-level only included in 2021 model. Standard errors are clustered by LA.

Figure 1: Model 1 LA average social care related quality of life across hourly pay distribution, 2018 and 2021

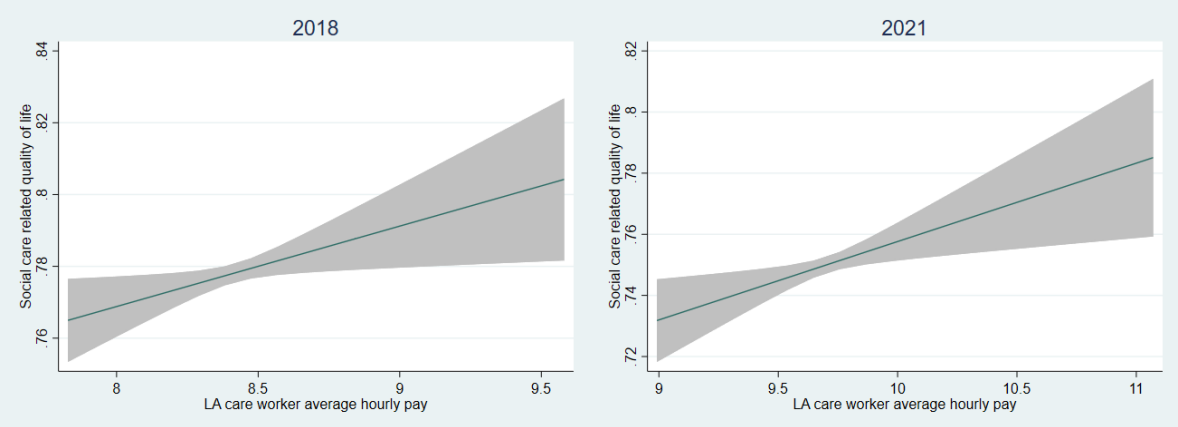

Figure 2: Model 2 LA average social care related quality of life across hourly pay distribution, by year

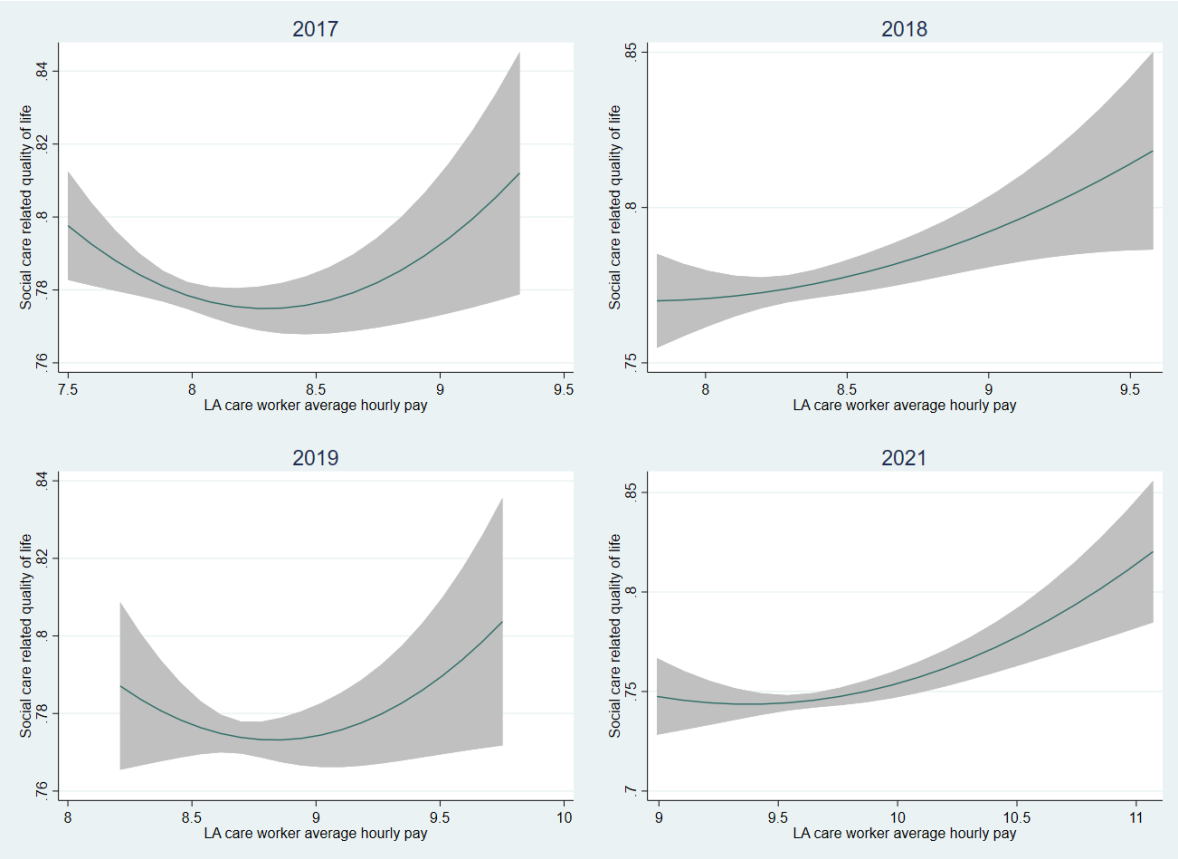

Figure 3: LA average social care related quality of life across Zero-Hours Contracts distribution, 2019 and 2021

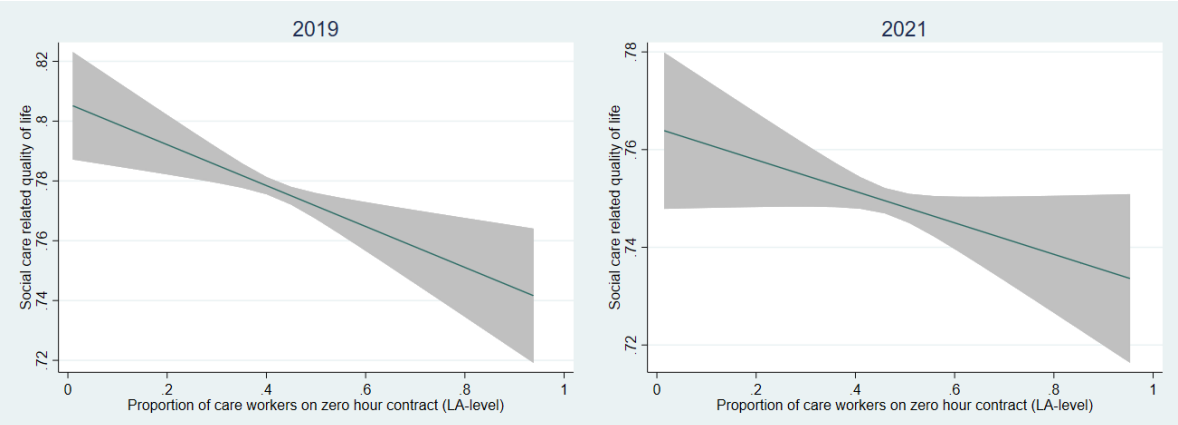

Table 5: Average outcomes at LA-level, by LA average hourly pay

	Mean LA Average hourly pay (All LAs)	-1 S.D.	+1 S.D.	+2 S.D.	99th PC
2017					
Average SCRQoL	0.777	0.787	0.775	0.783	0.800
Difference to average hourly pay		0.010** (0.001 – 0.019)	-0.001 (-0.008 – 0.005)	0.006 (-0.008 – 0.019)	0.024* (-0.003 – 0.051)
2018					
Average SCRQoL	0.776	0.771	0.784	0.797	0.818
Difference to average hourly pay		-0.005 (-0.015 – 0.005)	0.009** (0.002 – 0.016)	0.022*** (0.006 – 0.037)	0.043** (0.008 – 0.078)
2019					
Average SCRQoL	0.773	0.778	0.776	0.787	0.797
Difference to average hourly pay		0.005 (-0.007 – 0.017)	0.003 (-0.006 – 0.011)	0.014 (-0.005 – 0.032)	0.024* (-0.004 – 0.052)
2021					
Average SCRQoL	0.746	0.744	0.756	0.773	0.815
Difference to average hourly pay		-0.002 (-0.012 – 0.007)	0.010*** (0.003 – 0.016)	0.027*** (0.013 – 0.040)	0.051*** (0.026 – 0.076)
Pooled (All years)					
Average SCRQoL	0.770	0.766	0.776	0.784	0.789
Difference to average hourly pay		-0.004 (-0.010 – 0.002)	0.006** (0.001 – 0.012)	0.014** (0.001 – 0.027)	0.019** (0.001 – 0.037)

Notes: S.D. = Standard Deviation. PC = Percentile. *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively, in chi-squared test of equality in LA average social care outcomes between point X on the LA average hourly pay distribution and LA average care worker hourly pay. Using model 2 estimates. 95% confidence intervals of the difference to average hourly pay are presented in parentheses.

Table 6: Model 2 results of estimation of social care related quality of life model, by year and care setting

	2017	2018	2019	2021
Setting: Home care				
Average hourly pay	-0.002	-0.006	-0.035	-0.002
	(0.008)	(0.011)	(0.022)	(0.011)
Average hourly pay squared	0.041***	0.088***	0.081**	0.035***
	(0.012)	(0.015)	(0.039)	(0.011)
Proportion with Zero-Hours Contract	-0.040*	-0.009	-0.038	-0.023
	(0.023)	(0.018)	(0.034)	(0.016)
Proportion with social care qualification	-0.043	-0.085***	-0.054	-0.001
	(0.027)	(0.024)	(0.038)	(0.024)
Proportion British	-0.091**	0.023	-0.200***	-0.078***
	(0.043)	(0.036)	(0.061)	(0.026)
Proportion female	0.112	-0.140**	0.039	-0.057
	(0.078)	(0.066)	(0.091)	(0.060)
Average age	0.002	0.005**	0.017***	-0.004*
	(0.002)	(0.002)	(0.003)	(0.002)
Average social care experience	-0.008*	-0.005	-0.017***	0.002
	(0.004)	(0.004)	(0.006)	(0.003)
n	8,056	8,152	7,016	9,427
Setting: Care homes				
Average hourly pay	-0.043*	0.008	0.044*	-0.066**
	(0.023)	(0.031)	(0.027)	(0.031)
Average hourly pay squared	0.123***	-0.030	-0.076	0.164*
	(0.032)	(0.057)	(0.047)	(0.099)
Proportion with Zero-Hours Contracts	0.111**	0.185**	-0.117	-0.096
	(0.053)	(0.081)	(0.145)	(0.147)
Proportion with social care qualification	0.048*	0.054	0.087**	0.031
	(0.029)	(0.035)	(0.041)	(0.044)
Proportion British	0.059	0.029	-0.130**	-0.117*
	(0.044)	(0.052)	(0.062)	(0.066)
Proportion female	-0.138**	0.024	0.035	-0.061
	(0.069)	(0.080)	(0.085)	(0.112)
Average age	0.001	0.002	0.001	-0.002
	(0.003)	(0.003)	(0.003)	(0.004)
Average social care experience	-0.006	-0.010	-0.009	-0.016**
	(0.005)	(0.007)	(0.005)	(0.007)
n	3,575	3,754	3,191	2,302

Notes: Multi-level models of social care related quality of life by care setting. Models include all control variables listed in Table 1 at individual and LA level. Percentage self-funding their care at LA-level only included in 2021 model for home care and 2019 and 2021 for care homes. Standard errors are clustered by LA.

Table 7: OLS results of estimation of social care related quality of life, model 1, by year

	2017	2018	2019	2021	Pooled
Setting: All					
Average hourly pay	0.009	0.021**	0.011	0.025**	0.012**
	(0.008)	(0.010)	(0.014)	(0.010)	(0.005)
Proportion with Zero-Hours Contract	-0.016	0.001	-0.061**	-0.017	-0.010
	(0.018)	(0.016)	(0.024)	(0.016)	(0.011)
Proportion with social care qualification	-0.007	0.008	-0.013	0.040*	0.009
	(0.023)	(0.023)	(0.024)	(0.021)	(0.011)
Proportion British	-0.068**	-0.003	-0.125***	-0.054*	-0.044***
	(0.030)	(0.033)	(0.043)	(0.030)	(0.018)
Proportion female	-0.037	-0.046	0.021	-0.093**	-0.032
	(0.057)	(0.052)	(0.052)	(0.045)	(0.028)
Average age	0.002	0.001	0.004**	-0.002	0.0003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
Average social care experience	-0.005	-0.001	-0.002	-0.002	-0.001
	(0.003)	(0.004)	(0.004)	(0.002)	(0.002)
n	11,631	11,906	10,251	11,729	45,726

Notes: Multi-level models of social care related quality of life. Models include all control variables listed in Table 1 at individual and LA level. Percentage self-funding their care at LA-level only included in 2021 model. Standard errors are clustered by LA.

Table 8: Number of publicly-funded care recipients and FTE care workers in average LA, by year and care setting

	2017	2018	2019	2021	Pooled CS
Care recipients					
All settings	4,221	4,186	4,145	4,035	4,146
Care home	1,252	1,259	1,248	1,155	1,228
Community	2,969	2,927	2,896	2,879	2,917
Care workers (FTE)					
All settings	3,145	3,143	3,227	3,222	3,184
Care home	1,664	1,665	1,684	1,589	1,650
Community	1,481	1,478	1,543	1,633	1,533

Sources: Short and Long Term (SALT) collections (NHS Digital) and Adult Social Care Workforce Data Set (Skills for Care)

Table 9: Differences in cost and effect for LAs, by extent of higher average wage and year

	Average hourly pay	AHP + £0.25	AHP + £0.50	AHP + £0.75	AHP + £1
2017/18					
QALY (adjusted mean)	0.777 (0.773 – 0.781)	0.775 (0.768 – 0.781)	0.777 (0.768 – 0.787)	0.784 (0.771 – 0.798)	0.796 (0.774 – 0.818)
Outcome vs control (per person)	-	-0.0019 (-0.01 – 0.004)	0.0006 (-0.01 – 0.012)	0.008 (-0.01 – 0.027)	0.019 (-0.01 – 0.049)
Cost vs control (per person, £)	-	363.23	726.46	1,089.69	1,452.91
ICER (£ per QALY)	-	-	1,120,389	142,518	76,099
2018/19					
QALY (adjusted mean)	0.776 (0.771 – 0.780)	0.781 (0.774 – 0.788)	0.788 (0.779 – 0.798)	0.798 (0.783 – 0.812)	0.809 (0.786 – 0.832)
Outcome vs control (per person)		0.0055** (0.0002 – 0.011)	0.013** (0.002 – 0.024)	0.022** (0.003 – 0.042)	0.033** (0.003 – 0.063)
Cost vs control (per person, £)	-	366.03	732.07	1,098.10	1,464.13
ICER (£ per QALY)		66,535	56,937	49,757	44,186
2019/20					
QALY (adjusted mean)	0.773 (0.769 – 0.778)	0.775 (0.766 – 0.783)	0.780 (0.767 – 0.794)	0.791 (0.770 – 0.812)	0.806 (0.772 – 0.840)
Outcome vs control (per person)		0.0014 (-0.005 – 0.007)	0.007 (-0.01 – 0.021)	0.018 (-0.01 – 0.043)	0.033 (-0.01 – 0.074)
Cost vs control (per person, £)	-	379.53	759.07	1,138.60	1,518.13
ICER (£ per QALY)		278,677	104,886	64,599	46,672
2021/22					
QALY (adjusted mean)	0.746 (0.742 – 0.750)	0.752 (0.746 – 0.758)	0.761 (0.752 – 0.770)	0.773 (0.760 – 0.786)	0.789 (0.770 – 0.809)
Outcome vs control (per person)		0.006** (0.001 – 0.011)	0.015** (0.004 – 0.026)	0.027** (0.008 – 0.046)	0.043** (0.013 – 0.073)
cost vs control (per person, £)	-	389.28	778.55	1,167.83	1,557.10
ICER (£ per QALY)		67,883	52,585	42,915	36,249
Pooled cross section					
QALY (adjusted mean)	0.770 (0.767 – 0.773)	0.773 (0.769 – 0.776)	0.776 (0.771 – 0.781)	0.779 (0.772 – 0.787)	0.783 (0.772 – 0.794)
Outcome vs control (per person)		0.003** (0.0003 – 0.005)	0.006** (0.001 – 0.010)	0.009** (0.002 – 0.016)	0.013** (0.003 – 0.023)
cost vs control (per person, £)		374.41	748.83	1,123.24	1,497.66
ICER (£ per QALY)		140,386	131,027	122,834	115,606

Table 10: Differences in LA cost and effect, by extent of higher average wage and year, home care

	Average hourly pay	AHP + £0.25	AHP + £0.50	AHP + £0.75	AHP + £1
2017/18					
QALY (adjusted mean)	0.752 (0.748 – 0.755)	0.754 (0.749 – 0.759)	0.761 (0.751 – 0.771)	0.773 (0.756 – 0.791)	0.791 (0.763 – 0.819)
Outcome vs control (per person)		0.002 (-0.006 – 0.010)	0.009 (-0.010 – 0.029)	0.022 (-0.015 – 0.059)	0.039 (-0.022 – 0.101)
Cost vs control (per person, £)	-	243.18	486.35	729.53	972.70
ICER (£ per QALY)		112,121	51,385	33,330	24,664
2018/19					
QALY (adjusted mean)	0.740 (0.735 – 0.744)	0.743 (0.737 – 0.750)	0.758 (0.747 – 0.769)	0.784 (0.766 – 0.803)	0.821 (0.791 – 0.851)
Outcome vs control (per person)		0.004 (-0.007 – 0.014)	0.019 (-0.004 – 0.041)	0.045** (0.006 – 0.084)	0.082** (0.019 – 0.144)
Cost vs control (per person, £)	-	246.17	492.33	738.50	984.66
ICER (£ per QALY)		62,342	26,111	16,514	12,076
2019/20					
QALY (adjusted mean)	0.744 (0.737 – 0.751)	0.740 (0.728 – 0.753)	0.747 (0.726 – 0.767)	0.763 (0.726 – 0.801)	0.790 (0.725 – 0.855)
Outcome vs control (per person)		-0.004 (-0.016 – 0.008)	0.003 (-0.026 – 0.031)	0.019 (-0.037 – 0.076)	0.046 (-0.051 – 0.144)
Cost vs control (per person, £)	-	259.74	519.48	779.23	1,038.97
ICER (£ per QALY)		-	185,794	40,176	22,523
2021/22					
QALY (adjusted mean)	0.725 (0.721 – 0.729)	0.727 (0.721 – 0.733)	0.733 (0.722 – 0.743)	0.744 (0.727 – 0.760)	0.759 (0.734 – 0.783)
Outcome vs control (per person)		0.002 (-0.007 – 0.010)	0.008 (-0.009 – 0.025)	0.019 (-0.010 – 0.047)	0.034 (-0.010 – 0.077)
Cost vs control (per person, £)	-	276.52	553.03	829.55	1,106.06
ICER (£ per QALY)		155,418	69,352	44,636	32,907
Pooled Cross section					
QALY (adjusted mean)	0.744 (0.741 – 0.747)	0.747 (0.743 – 0.751)	0.751 (0.745 – 0.758)	0.757 (0.747 – 0.766)	0.763 (0.750 – 0.777)
Outcome vs control (per person)		0.003** (0.0001 – 0.006)	0.007** (0.001 – 0.014)	0.013** (0.003 – 0.023)	0.019*** (0.005 – 0.034)
Cost vs control (per person, £)		256.20	512.40	768.60	1,024.80
ICER (£ per QALY)		81,939	69,340	60,099	53,032

Table 11: Differences in LA cost and effect, by extent of higher average wage and year, care homes

	Average hourly pay	AHP + £0.25	AHP + £0.50	AHP + £0.75	AHP + £1
2017/18					
QALY (adjusted mean)	0.830 (0.825 – 0.836)	0.827 (0.815 – 0.839)	0.840 (0.822 – 0.857)	0.867 (0.840 – 0.894)	0.910 (0.866 – 0.954)
Outcome vs control (per person)		-0.003 (-0.016 – 0.009)	0.009 (-0.014 – 0.033)	0.037* (-0.001 – 0.075)	0.080*** (0.020 – 0.14)
Cost vs control (per person, £)	-	647.92	1,295.85	1,943.77	2,591.69
ICER (£ per QALY)		-	140,193	52,638	32,394
2018/19					
QALY (adjusted mean)	0.836 (0.829 – 0.844)	0.836 (0.821 – 0.851)	0.833 (0.812 – 0.853)	0.825 (0.786 – 0.864)	0.814 (0.740 – 0.888)
Outcome vs control (per person)		0.0001 (-0.012 – 0.012)	-0.004 (-0.028 – 0.020)	-0.011 (-0.057 – 0.034)	-0.022 (-0.102 – 0.058)
Cost vs control (per person, £)	-	644.71	1,289.42	1,934.12	2,578.83
ICER (£ per QALY)		10,890,372	-	-	-
2019/20					
QALY (adjusted mean)	0.838 (0.831 – 0.844)	0.844 (0.830 – 0.857)	0.840 (0.819 – 0.862)	0.828 (0.788 – 0.867)	0.805 (0.735 – 0.876)
Outcome vs control (per person)		0.006 (-0.006 – 0.018)	0.003 (-0.026 – 0.031)	-0.010 (-0.069 – 0.049)	-0.033 (-0.138 – 0.073)
Cost vs control (per person, £)	-	657.81	1,315.63	1,973.44	2,631.25
ICER (£ per QALY)		106,296	464,542	-	-
2021/22					
QALY (adjusted mean)	0.823 (0.813 – 0.833)	0.817 (0.801 – 0.832)	0.831 (0.787 – 0.875)	0.866 (0.766 – 0.965)	0.921 (0.741 – 1.100)
Outcome vs control (per person)		-0.006 (-0.025 – 0.013)	0.008 (-0.048 – 0.064)	0.043 (-0.079 – 0.164)	0.098 (-0.117 – 0.313)
Cost vs control (per person, £)	-	670.68	1,341.36	2,012.05	2,682.73
ICER (£ per QALY)		-	169,769	47,284	27,467
Pooled cross section					
QALY (adjusted mean)	0.835 (0.830 – 0.840)	0.834 (0.826 – 0.841)	0.831 (0.820 – 0.842)	0.828 (0.812 – 0.845)	0.825 (0.799 – 0.850)
Outcome vs control (per person)		-0.002 (-0.006 – 0.003)	-0.004 (-0.014 – 0.006)	-0.007 (-0.023 – 0.010)	-0.011 (-0.036 – 0.014)
Cost vs control (per person, £)		655.03	1,310.06	1,965.09	2,620.11
ICER (£ per QALY)		-	-	-	-

NIHR | Policy Research Unit in Adult Social Care

NIHR Policy Research Unit in Adult Social Care
London School of Economics and Political Science
University of Kent
King's College London

ascru@lse.ac.uk
www.ascru.nihr.ac.uk
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