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Job separation and sick leave in the long-term care sector in England

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Abstract

Staff turnover in the long-term care (LTC) sector in England is perceived to be relatively high. Most job leavers do not leave the sector, but rather move to other LTC employers. Nevertheless, there are concerns that the high 'churn' has a negative impact on continuity and quality of care, care providers' recruitment and training costs, and the remaining staff workload and motivation. Using a large employer-employee panel dataset, this study aimed to provide quantitative evidence on the drivers of LTC staff retention and sick leave in England, with a focus on job quality. After controlling for observed individual, organisational and local market characteristics as well as unobserved worker and employer heterogeneity, we found that, everything else being equal, wages and employment conditions (i.e. full time contracts and contracts with guaranteed working hours) significantly improve staff retention. The wage effect was significantly underestimated when not controlling for unobserved heterogeneity. Our findings show that improving pay and employment conditions for care staff employed by independent providers would reduce the staff turnover in LTC. We also found that, everything else being equal, the amount of sick leave was strongly associated with employment in publicly owned care establishments, most likely due to the relatively more generous sick leave terms they offer.

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Introduction

At over 30 per cent in 2019/20, the long-term care (LTC) staff turnover rate in England is perceived to be relatively high (Skills for Care 2020b). The turnover rates are higher in the independent sector LTC (34 per cent) compared to the public sector LTC (13 per cent). With respect to job roles, turnover rates are highest (38 per cent) among care workers (i.e. nursing aides or nursing assistants in the US), who are frontline staff supporting people with all aspects of their daily living (e.g. personal care, social and physical activities, and meals). Although the majority of job leavers (about 66 per cent) do not leave the sector, but rather move to other LTC employers, there are concerns that the high staff turnover rate has a negative impact on the continuity and quality of care, care providers' recruitment and training costs, and the remaining staff workload and motivation (Skills for Care 2020b; Eastwood 2017; Netten, Jones, and Sandhu 2007; Castle and Engberg 2005; Buchan 2010; Allan and Vadean 2021; Netten, Williams, and Darton 2005; Seavey 2004).

While most care providers and government agencies are favouring the improvement of staff retention (National Audit Office 2018; Health Education England 2017; Taylor 2018; The Health Foundation, The King's Fund, and Nuffiled Trust 2018), staff turnover in LTC increased by about 10 percentage points during the last decade (Skills for Care 2020b). The most common factors assumed to be related to low retention in LTC are low pay levels (often at minimum wage), lack of status (as care work is not recognised as a profession), limited opportunities for career progression, and employment without guaranteed hours (i.e. so called zero-hours contracts) (National Audit Office 2018; Health Education England 2017; Taylor 2018; Moriarty, Manthorpe, and Harris 2018).

Another aspect to retention is that even if not leaving the employer, some employees are reducing their working hours by taking more sick leave. Similar to turnover, absenteeism can negatively impact on productivity, employer costs and the workload and motivation of other staff (Mathis et al. 2016; Davey et al. 2009; Cikes, Ribaric, and Crnjar 2018). National statistics for the UK show that staff in health and social care had the highest sickness absence rate amongst all occupation groups in 2019, equivalent to 6.1 sick days per worker per year (Office for National Statistics 2021). In LTC an average of 4.7 sick days per employee was recorded among all job roles in 2019/20, leading to a total of about 7 million workdays lost over the year (Skills for Care 2020b). Sickness rates varied substantially by sector, with an average of 12.0 sick days per year for care workers employed by public care providers compared to about 4.8 sick days for care workers in the independent sector. The large differences in absence rates can be a reflection of differences in employment conditions, with more favourable sick leave policy in the public sector (Skills for Care 2020b).

Despite the importance of improving staff retention in the LTC industry, there is no hard evidence on what factors drive the retention of LTC staff in England. The aim of this paper was to address this research gap. The paper also extends existing (mainly US) literature on the determinants of turnover of LTC staff by controlling for unobserved worker heterogeneity. We used yearly data for 2016 to 2019 from the Adult Social Care Workforce Data Set (ASC-WDS) – an employer-employee linked dataset and the main source of LTC workforce intelligence in England. The main research questions we addressed are: What are the main factors that drive job separation and sick leave among LTC staff? How important is job quality (e.g. wages and guaranteed working hours) for staff retention?

After controlling for observed individual, organisational and local market characteristics as well as unobserved worker and employer heterogeneity, we found that, everything else being equal, wages and employment conditions (i.e. employment on full time contracts and contracts offering guaranteed working hours) significantly improve staff retention of LTC frontline staff in England. Controlling for unobserved heterogeneity proved rather important, as omitting it led to a significant

underestimation of the wage effect. We also found that the amount of sick leave was associated with a higher probability of job separation. Nonetheless, the amount of sick leave was mainly related to being more established in the job (i.e. longer tenure and higher pay) and working for a public sector provider (i.e. more favourable employment conditions).

The paper is structured as follows: the next section reviews the literature on determinants of staff turnover and sick leave in LTC, we then describe the dataset and analysed sample, present the econometric framework, discuss the results of the multivariate regression analysis, and conclude.

Determinants of job separation and absenteeism

There is a growing literature on the determinants of LTC workforce quitting behaviour and turnover (see (Turnpenny and Hussein 2020)). Studies at employer level found high turnover to be related to organisational characteristics (i.e. employers size, lower staffing levels, higher share of staff on contracts without guaranteed hours, for-profit ownership, domiciliary care provision, and lower quality) (Castle and Engberg 2006; 2005; Castle 2008; Hussein, Ismail, and Manthorpe 2016; Vadean and Saloniki 2020), management style (e.g. not asking for staff input and not providing staff with relevant information for making their own decisions) (Donoghue and Castle 2009), and local market characteristics (e.g. lower unemployment, and higher competition) (Castle 2008; Vadean and Saloniki 2020; Donoghue 2010).

Individual level analysis revealed, on the one hand, that intention to leave was associated with lower overall job satisfaction, job commitment, emotional exhaustion, work overload and work related stress (Karantzas et al. 2012; Gaudenz et al. 2019; Park et al. 2017; Morris 2009; Ha et al. 2014; Rosen et al. 2011), low satisfaction with work schedules, training and rewards (Castle et al. 2007; Yeatts et al. 2010), part-time employment or low number of working hours per week (Castle et al. 2007; Morris 2009), tenure or number of prior jobs held (Castle et al. 2007; Morris 2009), lack of supportive leadership (Gaudenz et al. 2019; Ha et al. 2014), and physical health problems (Gaudenz et al. 2019). On the other hand, actual job separation was found to be highly correlated with intention to leave and its associated determinants (e.g. job satisfaction, part-time employment, tenure or the number of prior jobs held, and low levels of support from supervisors and co-workers) (Castle et al. 2007; Morris 2009; Gao et al. 2014; Rosen et al. 2011). Moreover, depending on the country, further factors predicting job separation were low job control (in Australia) (Gao et al. 2014) and the absence of health insurance (in the US) (Rosen et al. 2011).

Where the data allowed the distinction between nursing home leavers who moved to another nursing home (i.e. 'switchers') and those who left the industry (i.e. 'leavers'), the findings showed the two groups had different characteristics and were motivated in their decision by different factors. 'Switchers' had at baseline similar job satisfaction and emotional wellbeing compared to 'stayers', but fewer benefits (e.g. health insurance). After switching jobs, they had greater wellbeing and more promotion opportunities compared to 'stayers'. 'Leavers', however, had at baseline relatively lower job satisfaction and emotional wellbeing and left mainly for health reasons (Rosen et al. 2011).

The influence of pay on turnover has been mixed. (Rosen et al. 2011) found that hourly pay did not predict the intention to leave or job separation, and argued that this may be explained by the fact that any pecuniary benefits (i.e. pay and rewards) may be offset by non-pecuniary and indirect costs associated with the status quo. On the other hand, (Morris 2009) found that job separation was negatively related to hourly wages and that a switch to another nursing care job was significantly associated with a wage increase. Nonetheless, this study was based on a small sample of 507 home

care workers and had a small geographic focus (i.e. Maine). Using nationally representative data for the US and accounting for the endogeneity of wages, (Baughman and Smith 2012) found only a small effect of wages in preventing turnover.

Another outcome of dissatisfaction with the job (or employer) can be temporary absence from work. Like turnover, excessive temporary absence can have negative consequences due to high compensation and staff replacement costs, staff shortages, overload and decreased morale of staff at work, and low productivity and output quality (Mathis et al. 2016; Davey et al. 2009; Cikes, Ribaric, and Crnjar 2018). Temporary absence can be due to illness, bereavement or other personal issues (Mathis et al. 2016), with the most common type being sick leave, measured by the number of sickness spells (frequency) or sick days per year (duration); for a review of the measures see (Cikes, Ribaric, and Crnjar 2018). Distinguishing between involuntary (or approved) and voluntary (or unapproved) absence can be very difficult given the fact that benefits are received in most cases only when 'calling in sick'. Therefore, all absences tend to be classified as sick days. Although imperfect, frequency and duration of sick days can be used to provide an index of voluntary versus involuntary absence, with higher frequency of sick leave as a sign for voluntary absence (Davey et al. 2009).

Comprehensive reviews highlighted a range of personal, attitudinal, demographic, health-related and organisational factors that have been identified as determinants of both absenteeism in general, and sick leave in particular (Beemsterboer et al. 2009; Cikes, Ribaric, and Crnjar 2018). Individual characteristics such as age, gender (i.e. women), being married, belonging to ethnic minorities and having dependent children have been found to be positively related to sick leave. So were poor health (i.e. low health status, physical/mental workload, and work related stress) and certain lifestyle choices (i.e. smoking and alcohol consumption) (Beemsterboer et al. 2009). On the other hand, attitudinal factors such as organisational commitment, job involvement and job satisfaction showed a rather strong negative association with absence, while organisational and job characteristics (i.e. firm size, public ownership, and employment on temporary contracts) were found to increase absenteeism (Cikes, Ribaric, and Crnjar 2018).

Studies on determinants of sick leave and absence from work of LTC staff are rather scarce; see (Cohen and Golan 2007) for a study on absenteeism and turnover intentions of LTC employees in Israel and (Andersen and Westgaard 2013) on sick leave of home care workers in Norway. The limited findings showed, though, that absence from work of LTC staff and hospital nurses were affected by similar factors: prior attendance records and work attitudes (e.g. job satisfaction, organizational commitment and work/job involvement). Retention factors (i.e. intention to stay and internal promotion opportunities) reduced absence from work, whereas burnout and job stress increased it. See (Davey et al. 2009) for a systematic review of determinants of hospital nurse absenteeism.

With respect to the relationship between job separation (i.e. permanent 'withdrawal') and absence from work (i.e. temporary 'withdrawal'), previous studies have found a positive relationship and evidence of progression from absence to quitting; see (Mitra, Jenkins, and Gupta 1992) for a meta-analysis. This relationship was confirmed by LTC workforce data from England. For instance, the turnover rate of care workers with more than 30 sick days per year was found to be over 5 percentage points higher compared to those taking up to six sick days per year (Skills for Care 2020b).

Data and sample characteristics

We used data from the Adult Social Care Workforce Data Set (ASC-WDS), an online data collection service managed by Skills for Care, and the leading source of workforce information for the LTC industry in England. It includes information on over 20,000 LTC providing establishments and over 700,000 workers across England, therefore covering about 50 per cent of the LTC market. The information is rich at both establishment (e.g. type of service provided, sector, establishment size, count of employees and job roles, starters, leavers and vacancies, etc.) and worker level (e.g. age, gender, nationality, qualifications, pay, working hours, job role and job type). Employers update the dataset regularly: while public employers update data on a mandatory basis in September each year, independent employers submit data on a voluntary basis, but are incentivised to do so by access to workforce development grants. All data in the ASC-WDS have been updated or confirmed to be up to date within the last two years and about 80 per cent of employers have updated their data in the past six months. Although the dataset does not cover all independent sector establishments, it does have a large enough sample to provide a solid basis for reliable workforce estimates at both national and local level. All ASC-WDS data was validated at source and has undergone rigorous data quality checks (Skills for Care 2020a; 2020b).

We used data from four cuts of the ASC-WDS: October 2016, October 2017, October 2018 and October 2019, matched at individual level, and with some variables from the provider data set. Skills for Care assigns to each establishment a unique and permanent ID and generates a unique and permanent ID for each worker with reported national insurance number and date of birth. We excluded employees from all establishments with records not updated for more than six months and establishments that had unique IDs for less than 75 per cent of their workers. We kept establishments providing either care home services (with or without nursing) or domiciliary care to adults (i.e. service users aged 18 and over). Statutory local authority, private (i.e. for-profit), and voluntary (i.e. not-for-profit) sector providers were all included.

We included in the sample employees aged between 16 and 64 in a direct care role, i.e. care workers (86 per cent), senior care workers (10 per cent), and other care providing roles (e.g. community support and outreach and activity workers) (4 per cent). We excluded observations for workers without a unique ID (as these could not be traced over time; 7 per cent), for those who erroneously had multiple entries per year with the same establishment (1 per cent), and for workers with two or more jobs in any year (6 per cent).[1]

The job separation variable was defined as a dummy variable equal to '0' if the employee was still with the same employer one year later ($t + 1$; or in one of the subsequent years [$t + 2$ or $t + 3$], in case both the employer and employee were not in the sample at $t + 1$ [or $t + 2$]). The job separation variable was defined as being equal to '1' if: a) the employee could be identified as working for another LTC employer in the sample at $t + 1$ (or in one of the subsequent years [$t + 2$ or $t + 3$], in case the employee was not in the sample at $t + 1$ [or $t + 2$]); or b) the employee left the sample, but their employer at time t was still in the sample. Employees for whom the job separation status could not be identified, because both they and their initial employer dropped from the sample in all subsequent years, were excluded from the analysis (14 per cent). The final sample,

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[1] As care workers employed on zero-hours contracts usually do not have the obligation to work a minimum number of hours per week (or month), some of them may hold zero-hours contracts with multiple agencies, but effectively work only for one. Therefore, for domiciliary care workers employed on zero-hours contracts, it is often not possible to correctly establish a job transition from one employer to another.

after excluding all observations with missing values for the variables included in the analysis, consisted of 355,155 observations of 211,283 job-spells in 8,312 care establishments.

We examined the national representativeness of the establishments in the analysed sample in Table 1. The table presents means for a set of characteristics (i.e. sector, care home service type, care home capacity, overall quality rating, and regional distribution) for both the analysed sample and all Care Quality Commission (CQC) regulated adult LTC establishments by care setting. The analysed sample includes about 25 per cent of the CQC registered care homes and about 20 per cent of the CQC registered domiciliary care establishments. Due to the fact that all statutory LA establishments update data on a mandatory basis, while independent employers submit data on a voluntary basis, statutory LA establishments are overrepresented in the analysed sample. However, as statutory LA establishments represent only about 3 per cent of the total market, the difference in shares is very small: about +2 percentage points for residential care and +5 percentage points for domiciliary care. The analysed sample also includes care homes with slightly larger capacity (i.e. care home beds) and establishments with better CQC quality rating.

We used raking to generate weights for each establishment (and year) using control totals obtained from the CQC care directory data, so that the weighted averages of the analysed sample matched the average characteristics of the establishments in the CQC care directory presented in Table 1. Following (Valliant and Dever 2018), we compared results of logistic regressions of job separation (i) without using weights, (ii) with using weights and (iii) in which we included interactions between weights and the independent variables included in the main analysis. The adjusted R-squares from the three logistic regressions were very similar (i.e. 0.051, 0.048 and 0.052 for residential care and 0.042, 0.040 and 0.045 for domiciliary care), indicating that unweighted regression analysis will give consistent estimates. Nonetheless, we used weights for computing the mean values presented in the descriptive statistics: Table 2 and Figures 1 to 10.

In Table 2, we present differences in characteristics between 'stayers' and 'leavers' by care setting. Job leavers were on average 3.6 to 3.9 years younger compared to stayers (depending on care setting), were living between 0.6 to 0.9 kilometres further away from their place of work, were less likely to have a formal qualification, were less likely to have received training if they worked in a care home (-3.7 percentage points) and slightly more likely to have received training if they worked in domiciliary care (+1.3 percentage points), had a shorter tenure with their employer (1.3 years shorter for domiciliary care and 2 years shorter for residential care employees), had slightly lower wages (-4 pence per hour [or -0.5 per cent] for domiciliary care and -15 pence per hour [or -2 per cent] for residential care employees), were more likely to be employed on a zero-hours contract and less likely to be employed full-time, and had reported more sick days in the previous 12 months.

In terms of employer characteristics, care staff were, for example, relatively more likely to leave private (i.e. for-profit) care establishments and establishments with a higher turnover and/or vacancy rate in the previous year, establishments having a lower staff per service user ratio (i.e. higher workload), and less likely to leave establishments being rated by the CQC as 'Good' or 'Outstanding' with respect to the Key Line of Enquiry 'Well-led' (i.e. establishments with better management and more support for learning, innovation and promotion of an open and fair culture) (Care Quality Commission 2018).

Figures 1 to 4 illustrate the differences in job separation rate for direct care staff by care type and a selection of factors. For both care types, the job separation rate is highest for younger workers (i.e. aged 16 to 24) and is decreasing with age (see Figure 1). For tenure, we observe quite a similar pattern: among recent recruits (i.e. tenure less than 1 year) the job separation rate is about 40 per

cent in domiciliary care and 35 per cent in residential care, but falls quite significantly among those with tenure over 10 years, to about 17 per cent for domiciliary care and 12 per cent in residential care workers (see Figure 2). The positive relationship between job stability and hourly wage (Figure 3) as well as negative relationship between job stability and contracts without guaranteed working hours (i.e. zero-hours contracts) (Figure 4) is more evident for residential care employees. The widespread use of zero-hours contracts in domiciliary care (56 per cent of domiciliary care workers (Skills for Care 2020b)) would give staff wanting to do such work fewer alternative options in terms of contract types. Moreover, likely differences between domiciliary care providers in the compensation of travel time (i.e. some include this in the hourly pay or others may compensate this separately) may mask differences in job separations by hourly wage. Figure 5 illustrates the relatively higher job separation rates in domiciliary care compared to residential care. However, there are no clear regional differences in job separations for either care setting.

Unsurprisingly, older employees (see Figure 6) as well as employees with longer job tenure (see Figure 7) took relatively more sick leave days per year. Most probably because older workers are more likely to develop health issues, but also the relationship with their employers is more established. Direct care workers in the top hourly wage quartile take on average one extra day of sick leave compared to care workers in the other wage quartiles (Figure 8). This is most likely due to statutory LA employees being comparatively better paid and taking substantially (about three times) more sick days compared to independent sector care workers (see Figure 9). This reflects differences in contract terms and conditions, with statutory LA establishments more likely to offer a higher contractual sick pay instead of statutory sick pay (Skills for Care 2020b). On the other hand, as illustrated by Figure 10, there are no obvious geographic differences in mean sick days per year by either care setting.

Econometric framework

Job separation

For comparison with previous studies on the determinants of LTC staff intentions to leave and actual voluntary turnover (Castle et al. 2007; Morris 2009; Rosen et al. 2011), we started the multivariate regression analysis with a pooled logistic regression. We also estimated a pooled probit and pooled linear probability model (LPM) to serve as baseline for the models controlling for unobserved heterogeneity presented below. The Huber-White sandwich estimator clustered by job spells was used to obtain robust standard errors.

In order to control for unobserved heterogeneity, we made use of the longitudinal dimension of the data and ran a correlated random effects (CRE) probit estimation. We preferred the CRE probit over fixed effects (FE) logit, as it allows the estimation of average partial effects. The Mundlak-type CRE probit model explicitly allows the unobserved heterogeneity (c_{ij}) to be correlated with the observed explanatory variables (x_{ijt}):

$$P(y_{ijt} = 1|x_{ijt}, c_{ij}) = \Phi(x_{ijt}\beta + c_{ij}) = \Phi(x_{ijt}\beta_{CREprobit} + \bar{z}_{ij}\xi_{CREprobit} + a_{ij}) \qquad (1)$$

where y_{ijt} is a binary response equal to one if worker i separated from employer j between t and $t+1$ and zero if the job spell continued at $t+1$, x_{ijt} is a set of explanatory variables at worker, employer and local area level, $\bar{z}_{ij}$ is the average over time of the subset of time-varying variables included in x_{ijt}, and a_{ij} is assumed to be independent from x_{ijt} (Wooldridge 2010).[2] Not controlling

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[2] The vector of variables x_{ijt} can include time-variant, time-invariant (e.g., gender) as well as time-dependent variables (e.g., age and tenure).

for unobserved heterogeneity could lead to an underestimation of the β coefficients (Keldenich and Luecke 2020). In our context, job stability may be the result of a good match, which could make separation substantially less likely. For example, a worker may have the right care ethic and motivation and/or the employer may value and support staff to deliver good quality care. Most of these unobservables would be time invariant (or change very little over time) and, thus be captured by $\bar{z}_{ij}$. Nonetheless, if they would change over time in a deterministic way, they would be captured by the year dummies.

Following previous literature, the explanatory variables (x_{ijt}) included in the model are worker characteristics collected in the ASC-WDS (i.e. age, gender, ethnicity, qualifications and distance to work), job related characteristics (i.e. job role, training, tenure, hourly wage, and full-time/part-time work), employer characteristics (i.e. sector, service and user type, size, turnover and vacancy rate, and staff per service user ratio [as a measure for workload]), and local market characteristics (i.e. unemployment rate, mean wage at local area level, and competition in the local social care market) (Castle et al. 2007; Morris 2009; Rosen et al. 2011; Baughman and Smith 2012). The ASC-WDS does not collect information on the care establishment source of funding and/or the share of self-funding clients, which could have a positive effect on revenue, and consequently on job quality. For this reason, we included instead local area controls for wealth in the local population (i.e. average house prices) and LTC public spending (i.e. the average tariff at LA-level for a publicly funded week of residential care as well as for an hour of domiciliary care). Additional to previous studies, we also included a variable capturing whether the worker was employed on a contract with guaranteed hours or not, as employment on zero-hours contracts is rather widespread in LTC in England, especially for domiciliary direct care staff (see also previous section).

In our case, observations (level 1) were clustered by job spells (level 2), which were clustered by care establishments (level 3). We, therefore, also estimated a three-level mixed effects model that accounts for the nested structure of the data.[3] Following (McNeish and Kelley 2019), we used a Mundlak-type within-between specification of the mixed effects estimator (WB-MEM) that allowed to control in addition to cluster variance, for unobserved heterogeneity (similar to a FE LPM estimator):

$$P\left(y_{ijt} = 1 | x_{ijt}, v_{ij}, v_j\right) = x_{ijt}\beta_{WB-MEM} + \bar{z}_{ij}\xi_{WB-MEM} + v_{ij} + v_j \qquad (2)$$
$$= x_{ijt}\beta_{WB-MEM} + \bar{x}_{ij}\xi_{WB-MEM} + \vartheta_{ij}\sigma_2 + \vartheta_j\sigma_3$$

where v_{ij} and v_j are the random effects, ϑ_{ij} and ϑ_j are the standardized univariate normal random effects at level 2 and level 3 respectively, and σ_2 and σ_3 are the variance terms at level 2 and level 3 respectively. The cluster variance is expressed in terms of an intraclass correlation (ICC): with $(\sigma_2{}^2 + \sigma_3{}^2)/(\sigma^2 + \sigma_2{}^2 + \sigma_3{}^2)$ representing the ICC at job-spell within care establishment level, and $\sigma_3{}^2/(\sigma^2 + \sigma_2{}^2 + \sigma_3{}^2)$ the ICC at care establishment level, where σ^2 is the variance of the normal distribution. A high ICC at care establishment level, for example, could show that job separations are clustered within a few establishments; establishments likely offering poor job quality.

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[3] LTC establishments are further clustered within 152 local authorities with social services responsibilities (level 4). The intraclass correlation at local authority level was, however, very close to zero and, therefore, not included in the analysis.

Sick leave

In our dataset, over 60 per cent of sick leave observations for direct care workers were zero. We, therefore, used a tobit model to account for left censoring and a correlated random effects (CRE) tobit estimator to account for left censoring and unobserved heterogeneity (ψ_{ij}):

$$s_{ijt} = \max\left(0, x_{ijt}\beta_{CREtobit} + \bar{z}_{ij}\xi_{CREtobit} + \psi_{ij}\right) \qquad (3)$$

where s_{ijt} is the observed number of sick days for employee i employed by the care establishment j at time t, x_{ijt} is a set of explanatory variables at worker, employer and local area level (as described in the job separation estimations), and $\bar{z}_{ij}$ is the average over time of the subset of time-varying variables included in x_{ijt}.[4]

Results

Job separation

Tables 3 and 4 present the estimation results of job separation for residential and domiciliary care respectively. In each table, the fist column includes the results from the logit estimation in the form of odd ratios. The next three columns include the marginal effects after logit and probit estimations, and the coefficients of the linear probability estimation respectively. The results show that at the means of the sample distribution both binary response and linear estimations produced quite similar results. Everything else being equal, we found a negative association between the probability of job separation and age, gender, qualification and tenure as well as a positive relationship with travel distance to work. These results confirm findings from previous studies analysing turnover of care workers employed in residential care (Castle et al. 2007; Rosen et al. 2011) and domiciliary care (Morris 2009) in the US. With respect to training, we found – as in previous studies – a negative relationship with job separation, but only for care home staff.

In terms of job characteristics, similar to the above-mentioned studies, we found that direct care staff employed on full-time contracts were less likely to leave their employer. Nonetheless, we found a somewhat larger and significant negative wage effect on job separation for residential care workers (odd ratio of 0.429, compared to only 0.96 to 0.98 in (Rosen et al. 2011; Baughman and Smith 2012)), but a lower negative effect on job separation for domiciliary care workers (marginal effect of -0.08, compared to -1.54 in (Morris 2009)). The difference in findings is likely due to differences in the labour markets and period analysed (i.e. the US or certain US states in the late 1990s or 2000s in the previous studies mentioned).

Most findings related to employer characteristics also confirm those from previous studies. For example, the establishment size was negatively related to the likelihood of job separation, while higher staff turnover and/or job vacancy rates in the previous 12 months and for-profit ownership increased the probability of leaving the employer.

The results from the estimations that control for unobserved heterogeneity are reported in Tables 3 and 4, column 5 (CRE probit) and column 6 (linear FE) respectively. As the unit of observation is the job spell (i.e. unique worker-establishment combination), the estimators control for (time-invariant) unobserved heterogeneity at both worker and establishment level. Statistical tests comparing these results with those of the estimations not controlling for unobserved effects showed that unobserved heterogeneity significantly affects the results. The results from the CRE probit and FE estimations are to be preferred as shown by the F-test of joint statistical significance of $\bar{z}_{ij}$ in CRE probit (χ^2 value of

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[4] See Footnote 1.

30,378 [p-value<0.001] for residential care and 25,909 [p-value<0.001] for domiciliary care) and the Hausman test comparing the linear RE and FE estimation results (χ^2 value of 24,189 [p-value<0.001] for residential care and 22,490 [p-value<0.001] for domiciliary care).

We discuss further the results of the CRE probit estimation, which are preferred due to the binary nature of the dependent variable. When controlling for unobserved heterogeneity, the wage effect is about twice as large for residential care staff (i.e. -0.28 in the CRE probit compared to -0.13 in the pooled probit estimation) and about three times larger for domiciliary care staff (i.e. -0.28 in the CRE probit compared to -0.08 in the pooled probit estimation). These results suggest that not accounting for unobserved effects led to a substantial downward bias in the wage effect on job separation. This effect is substantially larger and statistically significant compared to previous studies on determinants of individual turnover of LTC staff in the US (Rosen et al. 2011; Baughman and Smith 2012) as well as a study on job quits of National Health Service (NHS) nurses in England (Frijters, Shields, and Price 2007).

We explored the functional form of the relationship between wages and job separation by estimating a model with a 3-degree wage polynomial. The predicted job separation rates by wage (Figure 11) illustrate that the wage effect has diminishing marginal magnitudes, i.e. an increase in wage has a stronger effect on reducing job separations at lower wage levels and a weaker effect at higher wage levels. The wage effect is modest, but not unimportant. An increase in wages from the average sample wage (£7.69 in residential and £7.93 in domiciliary care; in 2015 £) to the Real Living Wage level £8.64 (in 2015 £), would bring the sample mean of job separation down from about 24 to 20 per cent in residential care and from about 28 to 25 per cent in domiciliary care.

In terms of other job characteristics, employment on contracts without guaranteed hours (i.e. zero-hours contracts) was rather strongly related (12.5 percentage points higher probability) to leaving the employer in the case of residential staff. For domiciliary care staff – probably due to the widespread use of zero-hours contracts (about 56 per cent of domiciliary care staff) – employment on zero-hours contracts increased the likelihood of job separation by only 3 percentage points. On the other hand, being employed on a full-time contract reduced the probability of leaving by -2.6 percentage points for residential care staff and -4.3 percentage points for domiciliary care staff. We also found no difference in the probability of job separation between job roles (i.e. senior care workers, care workers and other care-providing workers) in residential care, and a small higher probability of job separation for care workers (3.2 percentage points) and other care-providing roles (4.4 percentage points) in domiciliary care. This potentially confirms that the career step from care worker to senior care worker does not bring sufficient recognition in terms of career progression (Skills for Care 2020b).

We found no effect for having received training on job separation in residential care after controlling for unobserved heterogeneity. Training provision did not seem to improve retention, probably because of the lack of pay progression and, therefore, low rewards to additional skills in LTC. However, the effect of training was positive for domiciliary care workers and the effect size relatively larger compared to the standard probit model (i.e. without controlling for unobserved worker and employer characteristics). Having received training increased the likelihood of leaving a domiciliary care job by 1.8 percentage points. This finding is rather concerning, as in the long-term a positive relationship between training and job separation can create disincentives for care providers to invest in staff skills (Moriarty, Manthorpe, and Harris 2018).

In terms of employer characteristics, we found that care homes with better management (i.e. rated as 'Good' or 'Outstanding' with respect to the CQC Key Line of Enquiry on 'Well-led') had a 1.9 per

cent higher probability to retain direct care staff, confirming that good management is important for increasing staff retention.[5] Nonetheless, we found no similar effect for domiciliary care employers.

Another notable finding is that after controlling for other factors and unobserved heterogeneity, direct care staff employed by private care homes were about equally likely to leave their employer compared to similar staff employed by public (i.e. statutory local authority) care homes. On the other hand, everything else being equal, voluntary (i.e. not-for-profit) care establishments, were slightly better at retaining staff compared to private establishments (i.e. 1 to 2 percentage points lower probability of job separation, depending on care setting). It is well known that job quality and employment conditions are higher in voluntary care establishments (Skills for Care 2020a; 2020b). Nonetheless, the differences between sectors could only partly be captured by the other covariates and controls for unobserved heterogeneity.

When assessing the residual variance in job separations, we note that a substantial part of it (about 72 per cent) is due to unobserved heterogeneity between job spells, which further explains the difference in results between estimations with and without controlling for unobserved effects. A further question is whether job separations are clustered at care establishment level. In column 7 (of each Table 3 and 4), we present the results from the linear within-between multi-level estimation (WB-MEM), with random effects at job-spell and establishment level. The coefficients are very similar to those of the linear probability fixed effects estimation. The intraclass correlations for either the residential or domiciliary care estimation show that conditional on the covariates, job separations had a rather low correlation within establishments: establishment random effects made only 21 per cent (for residential care) and 29 per cent (for domiciliary care) of the total residual variance.[6] The rather low ICCs show that job separations are rather dispersed among establishments.

Predicted job separations by age group

There is the question whether the identified drivers of job separation have different effects for different age groups. In particular, we are interested to depict whether younger care staff were relatively more or less responsive to wages, training and contract types compared to other care staff. Figures 12, 13 and 14 present predicted probabilities of job separations by ager group and hourly wage, zero-hour contracts and training receipt respectively. We note rather similar wage effects (i.e. slopes) between age groups for residential frontline staff. In the case of domiciliary care staff, however, and everything else being equal, we observe that for younger staff (i.e. aged 16-24) wages were decreasing the likelihood of job separations to a lower extent compared to all other age groups. Employment on zero-hour contracts has increased the probability of job separations rather similarly for all age groups. Moreover, while there was no relationship between training and job separations in residential care for either age group, we found that having received training increased the probability of job separation more strongly for younger (i.e. age 16-24) domiciliary care workers.

It seems, therefore, that some young workers take-up domiciliary care – potentially due to low entry requirements – with the main aim of accumulating some job-related training and experience needed for finding better jobs elsewhere.

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[5] This finding aligns with those from (Towers et al. 2021), that show that good management (as measured by the CQC Key Line of Enquiry on 'Well-led') is significantly improving care home residents' quality of life, as measured by the Adult Social Care Outcomes Toolkit (ASCOT).

[6] In terms of the total variance (i.e. without including covariates in the estimations), establishment level random effects made only 12 per cent of the total variance in job separation of residential care workers and 22 per cent of the total variance in job separation of domiciliary care workers.

Sick leave

Table 5 presents the results of the analysis on sick days for both residential care (left) and domiciliary care (right). For each care setting, column 1 includes the results of the baseline tobit estimation of log of sick days, column 2 the estimation results of a CRE tobit estimation that accounts for unobserved heterogeneity, column 3 the estimation of a structural model including a sick days (estimated by CRE tobit) and a job separation equation (estimated by CRE probit), which allows for the correlation between the error terms of the two equations, while column 4 includes the CRE estimations of job separation in which we include the log of sick days as additional explanatory variable.

The F-test of joint significance of the coefficients of the time-averaged terms ($\bar{z}_{ij}$) from the CRE tobit estimations indicated that they were statistically different from zero at 1 per cent level – χ^2 value of 35.97 (p-value<0.001) for residential care and 12.71 (p-value<0.001) for domiciliary care – indicating that the CRE tobit estimations controlling for unobserved heterogeneity are to be preferred.

When looking at the results of the structural equation estimation, we observe that the marginal effects of the various factors included in the estimation were quite similar to those from the CRE tobit estimation. In general, for both residential and domiciliary care, staff who were more established in their jobs (i.e. those who were with their current employer for longer time, had higher wages, were employed on full-time contracts, and on contracts with guaranteed hours) took significantly more sick days per year. Nonetheless, even after controlling for a large number of observed factors and unobserved heterogeneity, we found that the sector of employment had the strongest effect on the number of sick days. Everything else being equal, direct care staff employed in statutory local authority owned care homes took about 68 per cent more sick days per year compared to care home staff in the private or voluntary sector. Similarly, domiciliary care staff employed by local authorities took about 59 per cent more sick days per year compared to staff in the private sector and about 50 per cent more sick days per year compared to staff in the voluntary sector. The difference between sectors reflects differences in contract terms and conditions, with statutory LA establishments usually offering more generous contractual sick pay, as compared to statutory sick pay by independent care providers (Skills for Care 2020b). Due to the low level of statutory sick pay (i.e. £96.35 per week since April 2021), care workers employed in the independent sector often cannot afford to take paid sick leave and go to work even when having a minor illnesses (Lewis 2020).

The job separation estimations in column 4 confirm the positive relationship between (and progression from) temporary 'withdrawal' from work (i.e. sick leave) to permanent 'withdrawal' (i.e. job separation (Mitra, Jenkins, and Gupta 1992). Nonetheless, the effect is quite small and statistically significant only for residential care staff. Everything else being equal, a 10 per cent higher number of sick days in the past 12 months increased the likelihood of separation for care home frontline staff in the next 12 months by about 0.2 percentage points.

Discussion

Since the 1990s England's councils with LTC responsibilities have started to reduce the amount of LTC services they provide directly, and nowadays about nine in ten care staff are employed by independent providers. The outsourcing of LTC services has provided financial savings to the public purse, but at the cost of the LTC workforce, leading to the creation of a two-class system of care staff. Staff employed by independent sector (in particular, for-profit providers) have low wages (on average 35 per cent are paid just the statutory minimum wage), a high share are employed on contracts without guaranteed hours (e.g. 56 per cent of domiciliary frontline staff), and are paid only

the substantially lower sick pay (Skills for Care 2020b; 2021a). A report by Community Integrated Care estimated that the pay gap between frontline care staff employed in the independent sector and those employed in equivalent public sector roles in local authorities and the National Health Service (NHS) is about 40 per cent or nearly £7,000 per year (Community Integrated Care 2021).

Considering the above, it is not surprising that staff turnover in the independent LTC sector in England is high (34 per cent) compared to the public sector LTC and equivalent care roles in the NHS (i.e. healthcare assistants) (13 per cent), and that a large share of the staff leaving LTC move to jobs within the NHS (Skills for Care 2020b). Finding practical solutions to the persistent staff turnover in LTC is an important issue faced by care providers and policymakers. Its importance is linked to the sustainability of a care workforce able to provide good quality services (Castle et al. 2007; Netten, Jones, and Sandhu 2007; Eastwood 2017; Skills for Care 2020b; Allan and Vadean 2021) as well as the need to increase future LTC supply in line with the predicted increase in LTC demand (National Audit Office 2018; Wittenberg et al. 2019; Atkins et al. 2019).

This study focused on assessing the relationship between job quality and job separation in LTC. Using longitudinal data for England from the Adult Social Care Workforce Data Set (ASC-WDS), we found a significant negative effect of wages on actual job separation and a downward bias (i.e. closer to zero) of the wage effect when not controlling for unobserved heterogeneity. This finding contrasts to those of previous worker-level studies from the US (Rosen et al. 2011; Baughman and Smith 2012), which found small or not significant wage effects, but in which unobserved heterogeneity could not be taken into account.

The wage effect is not very large, but not unimportant. A 10 per cent wage increase from the sample mean would reduce the job separation rate by about 3 percentage points. This shows that LTC staff retention may be improved to some extent by increasing wages. It can, however, be combined with other aspects of job quality to reduce staff turnover even more. One such aspect is the contract type, with our results confirming that employment on full-time contracts and contracts with guaranteed working hours both have a positive effect on staff retention. While contracts without guaranteed working hours appear to give employers more flexibility to adapt to fluctuations in demand for services, they might represent a false economy, as they lead to increased staff turnover and, therefore, higher recruitment and induction costs.

We also find that training is not improving retention, but even likely to increase job separation of domiciliary frontline staff. This is not surprising, considering that the current pay structure in LTC allows little progression for skills and experience (Skills for Care 2020b). A concern for the LTC sector would be that this may create disincentives for care providers to invest in staff skills, with long-term consequences for the quality of services (Moriarty, Manthorpe, and Harris 2018).

With respect to determinants of sick leave, our findings show that in general more established workers (i.e. with longer tenure, having higher wages, and employed on full-time contracts with guaranteed hours) are taking more sick days off. The strongest factor related to the amount of sick leave is, however, the employment sector. Everything else being equal, care staff employed in the public sector took 50 to 70 per cent more sick days per year compared to those employed by independent care providers. This is likely due to the relatively more generous sick leave terms offered by public sector employers.

Our findings show that improving pay and employment conditions for care staff in the independent sector would reduce the staff turnover in LTC. A coherent strategy for England could be to align pay and conditions in the independent sector to those in the public sector and put an end to the 'two-

class' care staff system. This will come, however, at a cost to the local and central governments, as tariffs paid by local councils will need to increase in order for care providers to be able to afford to pay higher wages, improve pay progression, and offer contracts with guaranteed hours and more generous sick leave. Local councils may subsequently need to link LTC commissioning practices to the independent providers' staff pay and employment conditions, to ensure that increased tariffs will benefit the workforce.

The positive relationship between job separation and distance to work as well as the negative relationship between separations and age and tenure might also prove that more has to be done to improve job matching. Skills for Care, for example, is supporting care providers to improve recruitment by using a value-based approach that involves establishing strong workplace values and ensuring that the existing staff and new recruits observe them (Skills for Care 2021b). They have also partnered with the employee referral app 'Care Friends' to help care providers implement more innovative strategies to attract the 'right' people to the sector (Eastwood 2017).

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Figure 1: Job separation rate by age group and care setting – direct care staff
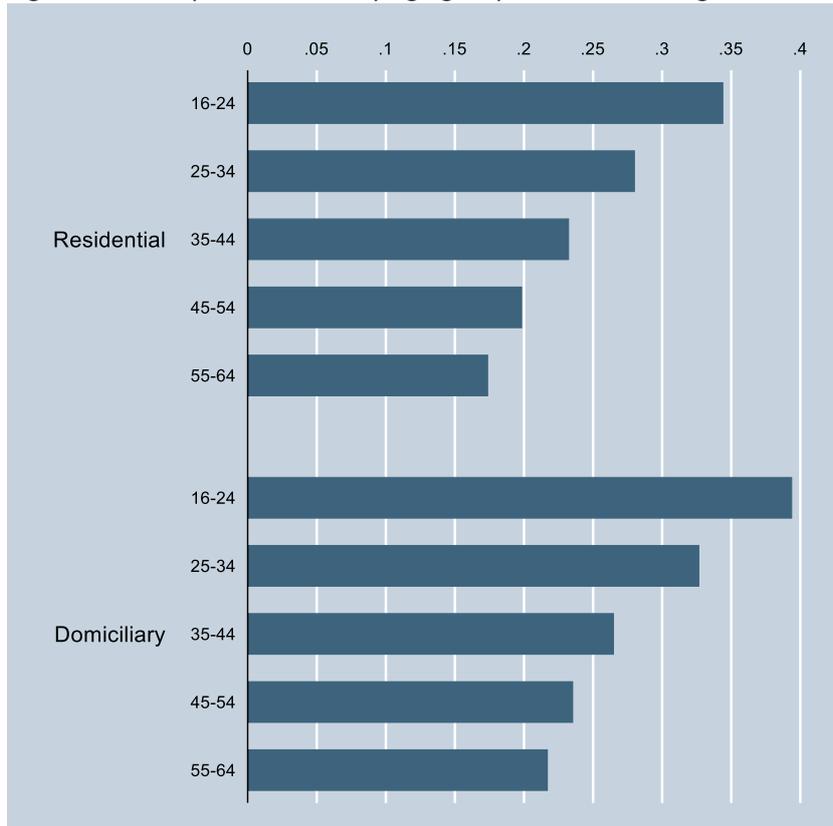
Data source: Adult Social Care Workforce Data Set (ASC-WDS); pooled Oct 2016, Oct 2017 and Oct 2018.

Figure 2: Job separation rate by job tenure and care setting – direct care staff
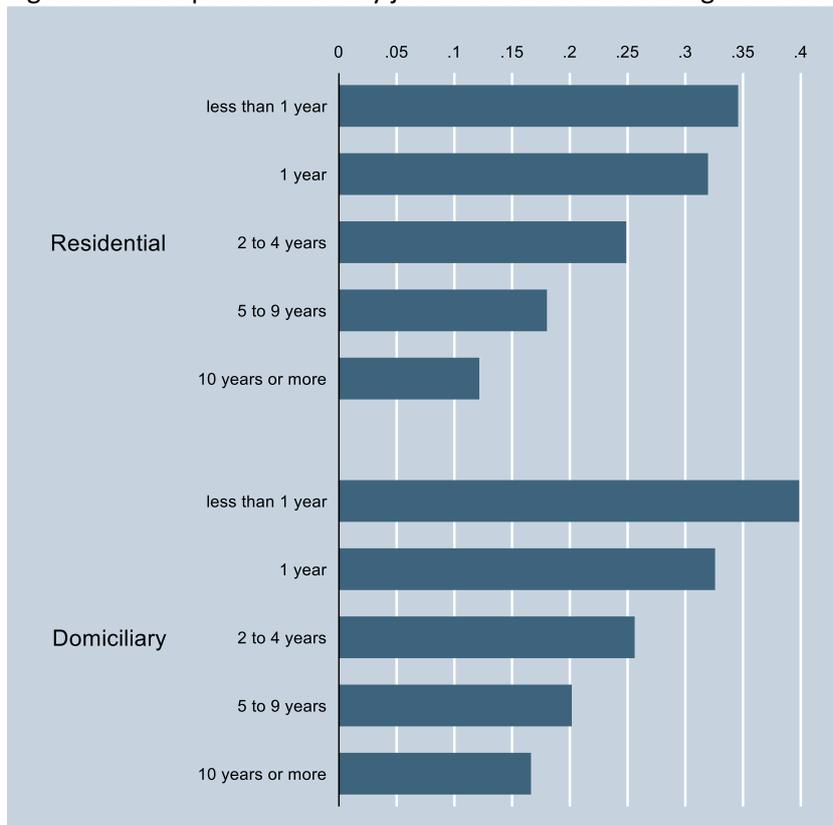
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Figure 3: Job separation rate by hourly wage and care setting – direct care staff
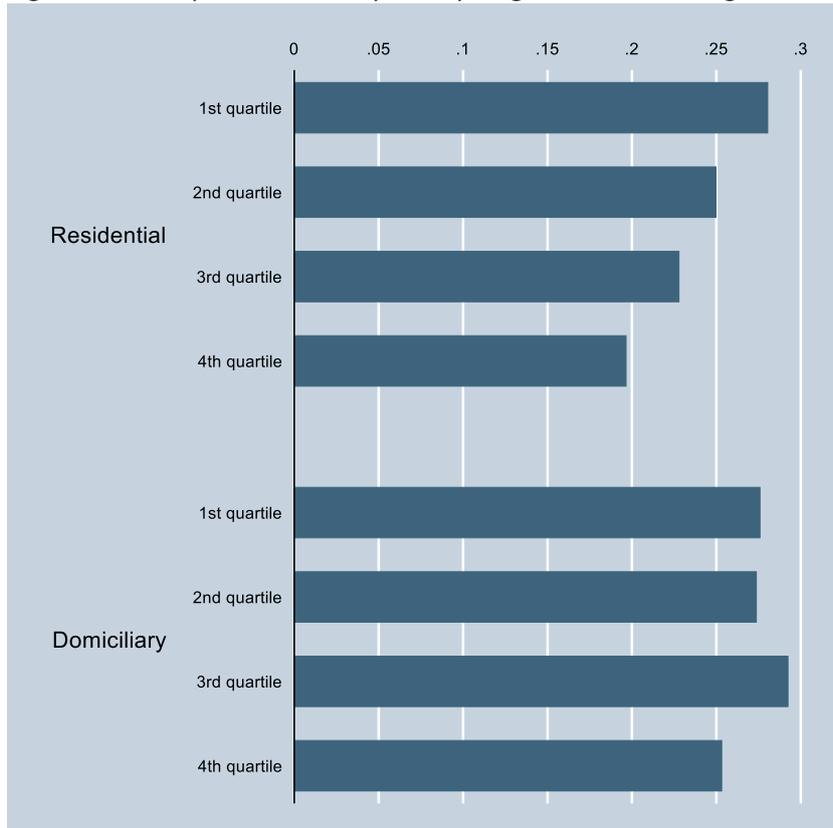
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Figure 4: Job separation rate by contract type and care setting – direct care staff
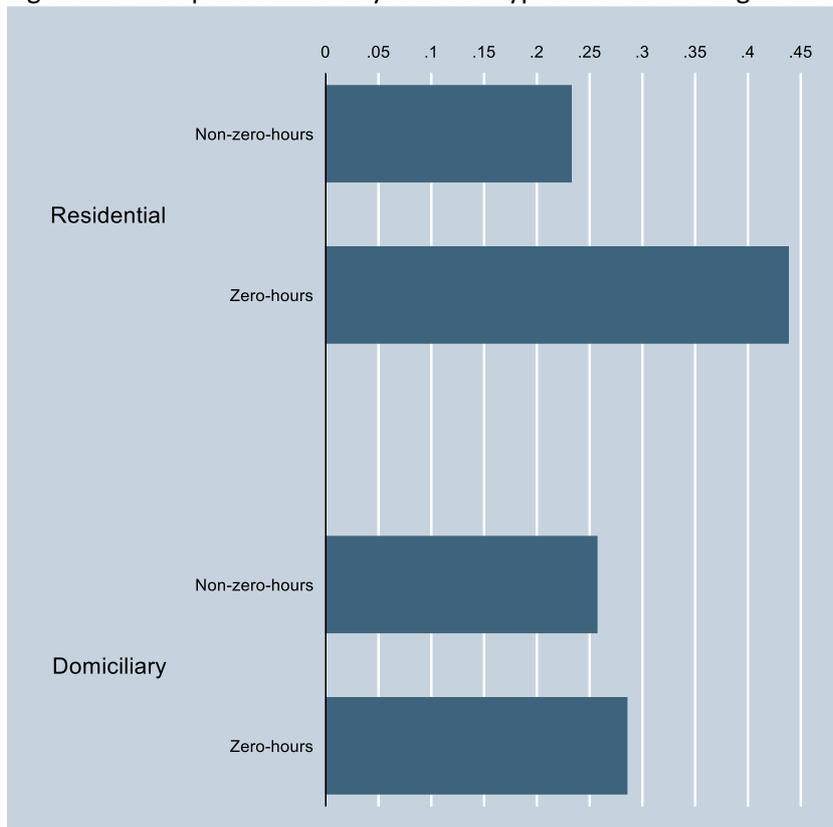
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Figure 5: Job separation rate by care setting – direct care staff
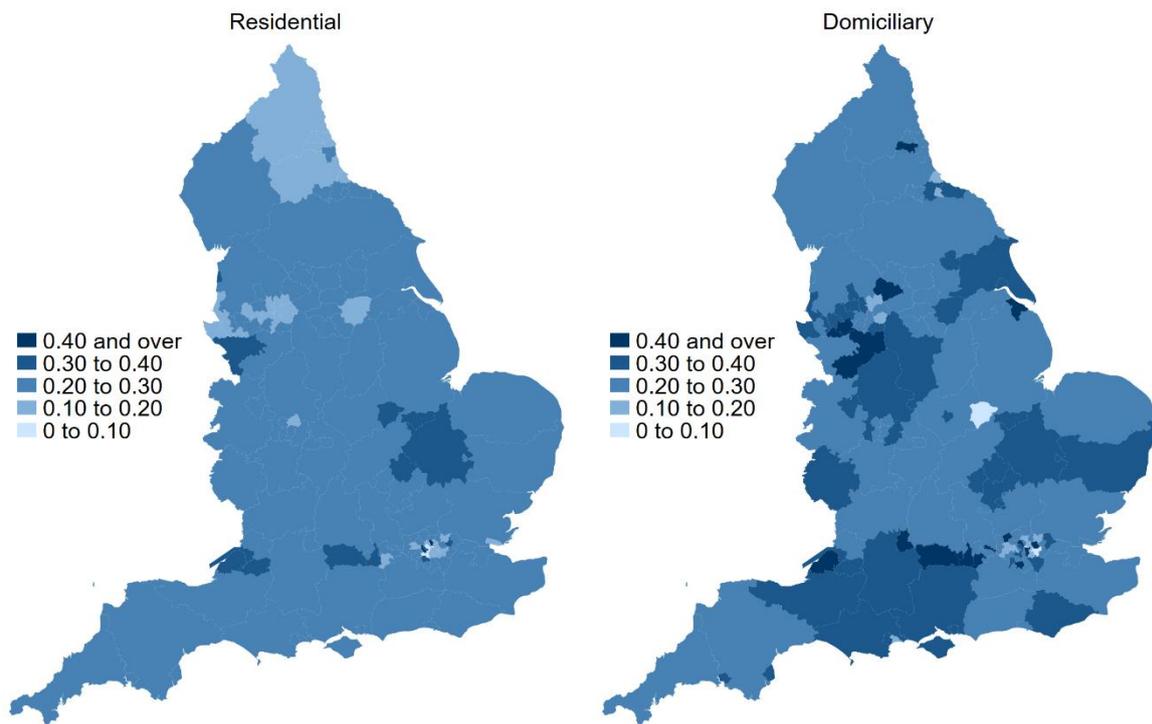
Residential | Domiciliary

0.40 and over
0.30 to 0.40
0.20 to 0.30
0.10 to 0.20
0 to 0.10

Data source: Adult Social Care Workforce Data Set (ASC-WDS); pooled Oct 2016, Oct 2017 and Oct 2018.

Figure 6: Mean sick days per year by age group and care setting – direct care staff
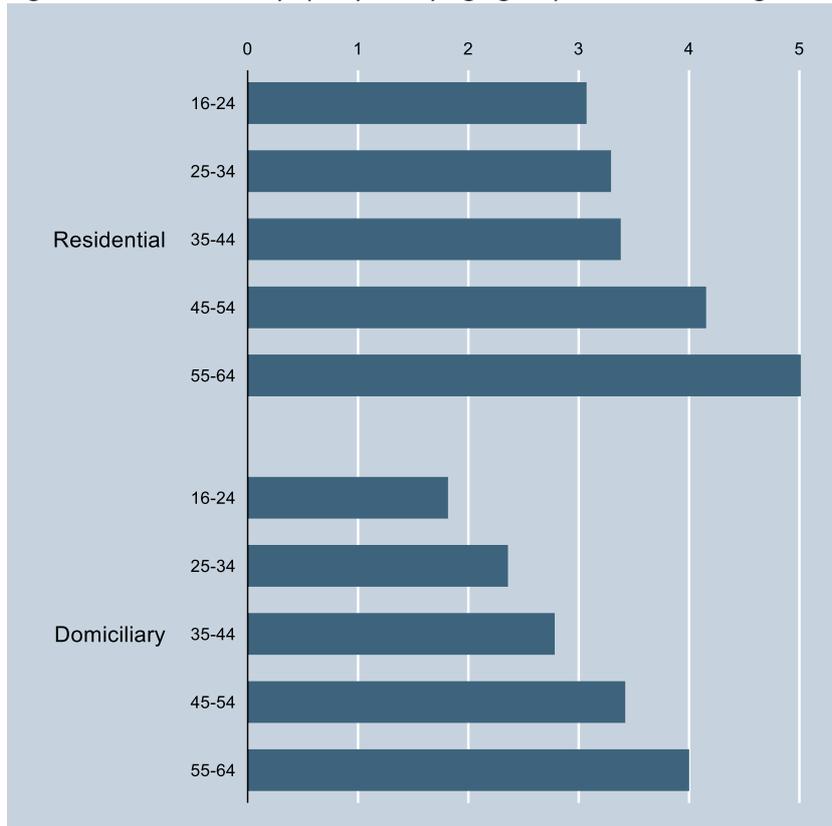
Data source: Adult Social Care Workforce Data Set (ASC-WDS); pooled Oct 2016, Oct 2017 and Oct 2018.

Figure 7: Mean sick days per year by job tenure and care setting – direct care staff
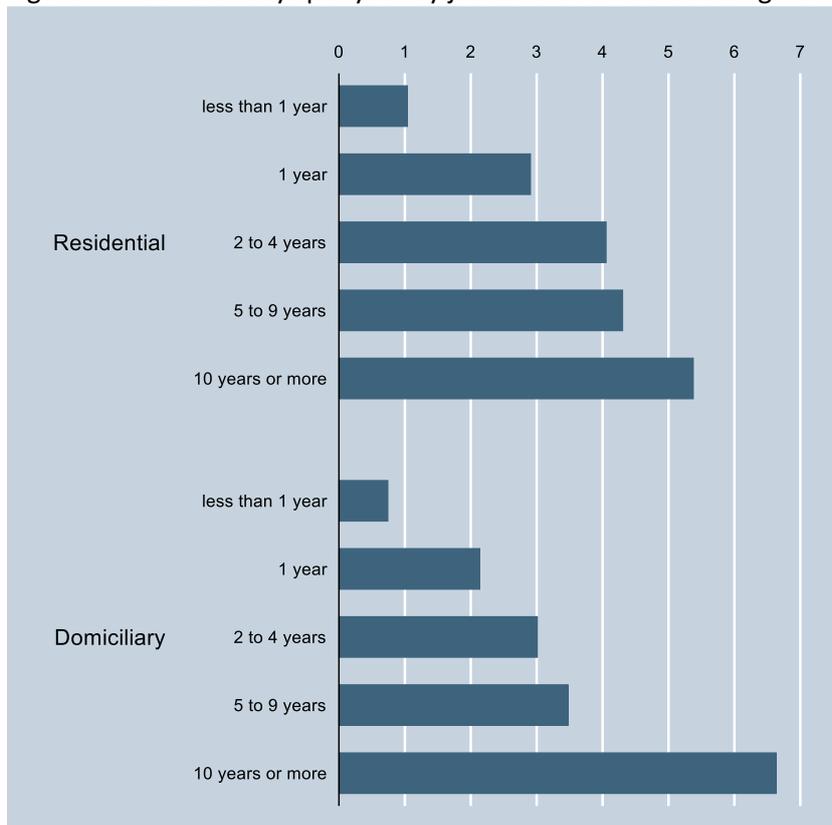
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Figure 8: Mean sick days per year by hourly wage and care setting – direct care staff
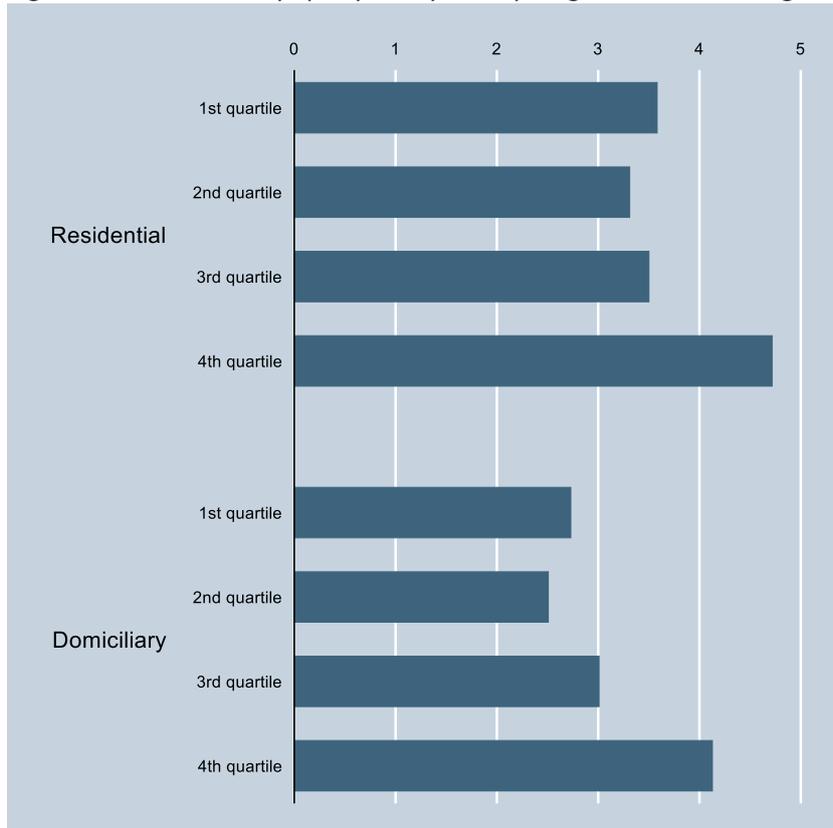
Data source: Adult Social Care Workforce Data Set (ASC-WDS); pooled Oct 2016, Oct 2017 and Oct 2018.

Figure 9: Mean sick days per year by job separation, care setting and sector – direct care staff
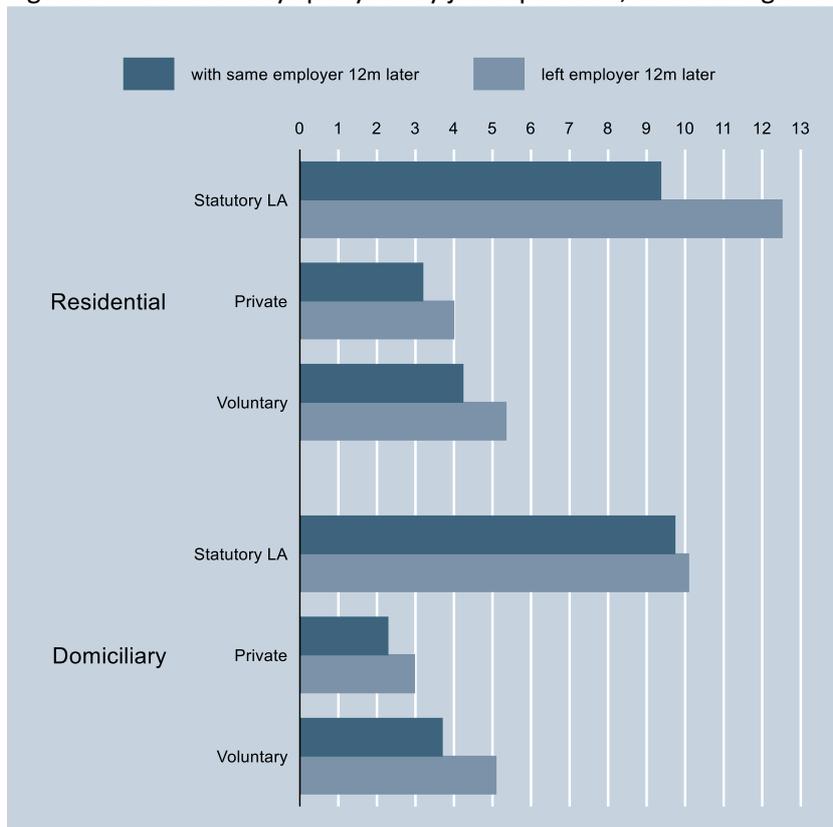
Data source: Adult Social Care Workforce Data Set (ASC-WDS); pooled Oct 2016, Oct 2017 and Oct 2018.

Figure 10: Mean sick days per year by care setting – direct care staff
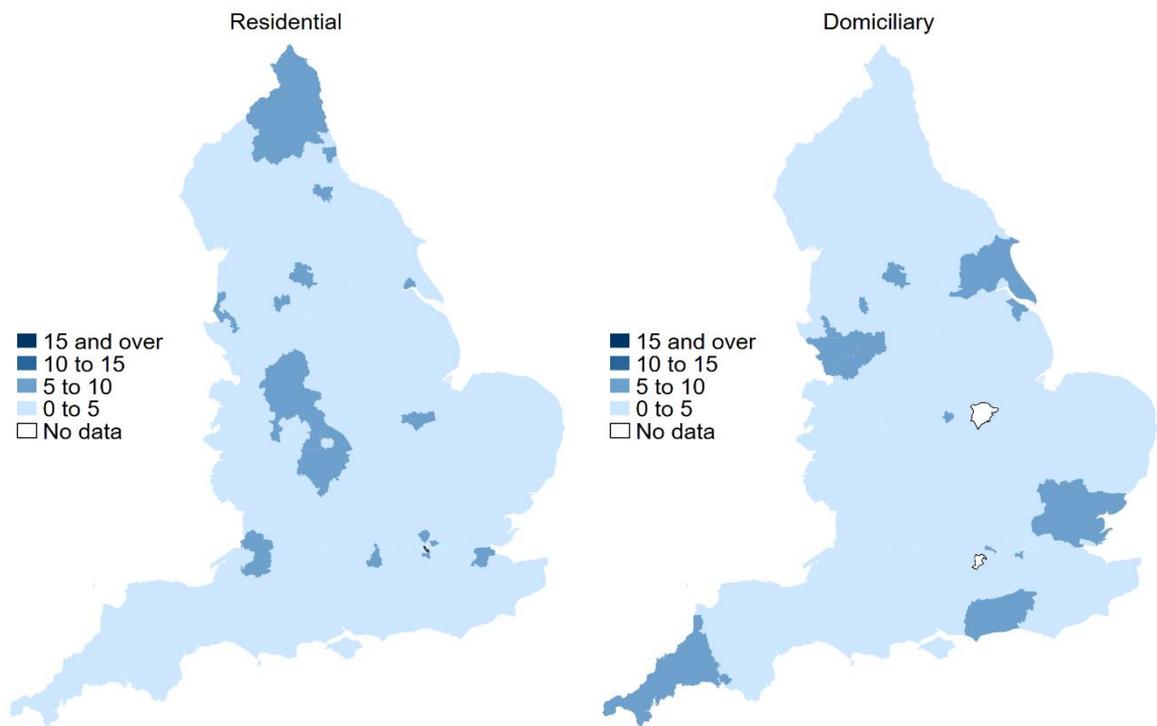
Data source: Adult Social Care Workforce Data Set (ASC-WDS); pooled Oct 2016, Oct 2017 and Oct 2018.

Figure 11: Predicted probabilities of job separation by hourly wage
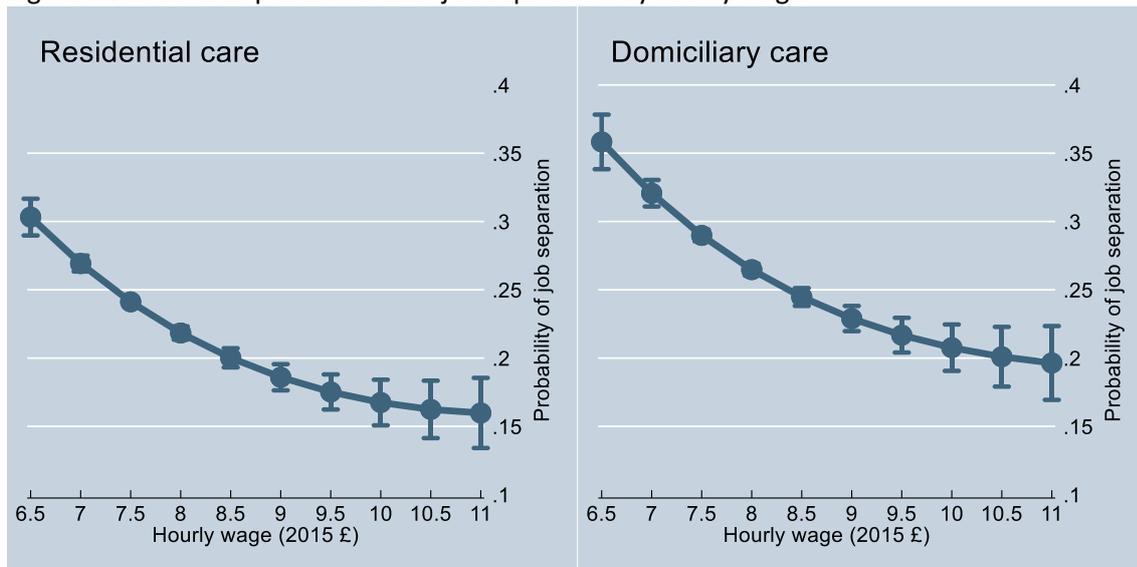
Note: Based on CRE probit estimations with 3-degree wage polynomial.
Data source: Adult Social Care Workforce Data Set (ASC-WDS); pooled Oct 2016, Oct 2017 and Oct 2018.

Figure 12: Predicted probabilities of job separation by hourly wage and age group
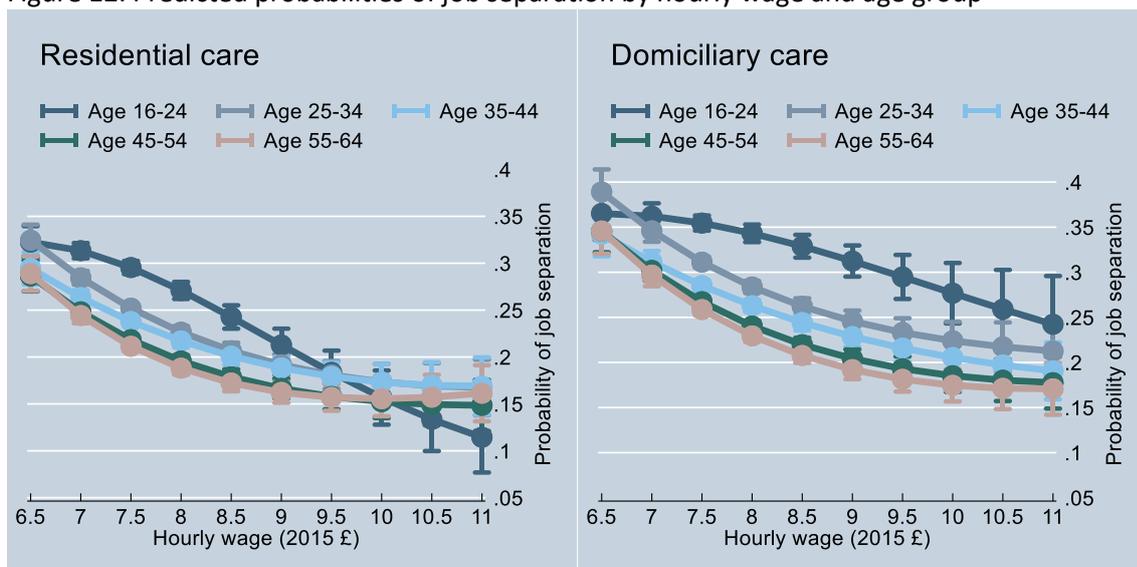
Note: Based on CRE probit estimations with 3-degree wage polynomial.
Data source: Adult Social Care Workforce Data Set (ASC-WDS); pooled Oct 2016, Oct 2017 and Oct 2018.

Figure 13: Predicted probabilities of job separation by contract type and age group
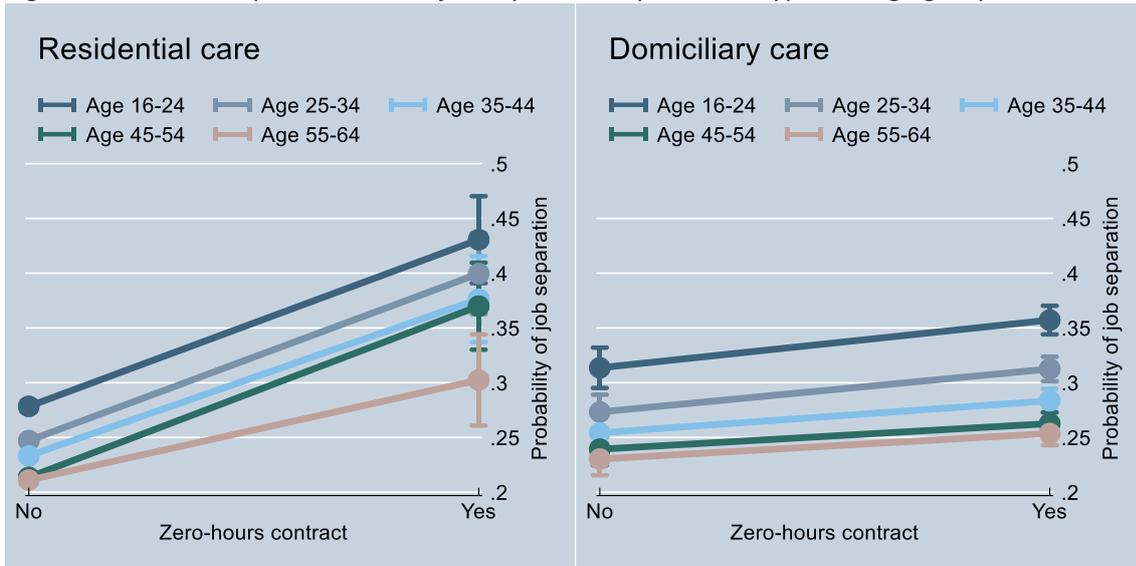
Data source: Adult Social Care Workforce Data Set (ASC-WDS); pooled Oct 2016, Oct 2017 and Oct 2018.

Figure 14: Predicted probabilities of job separation by training incidence and age group
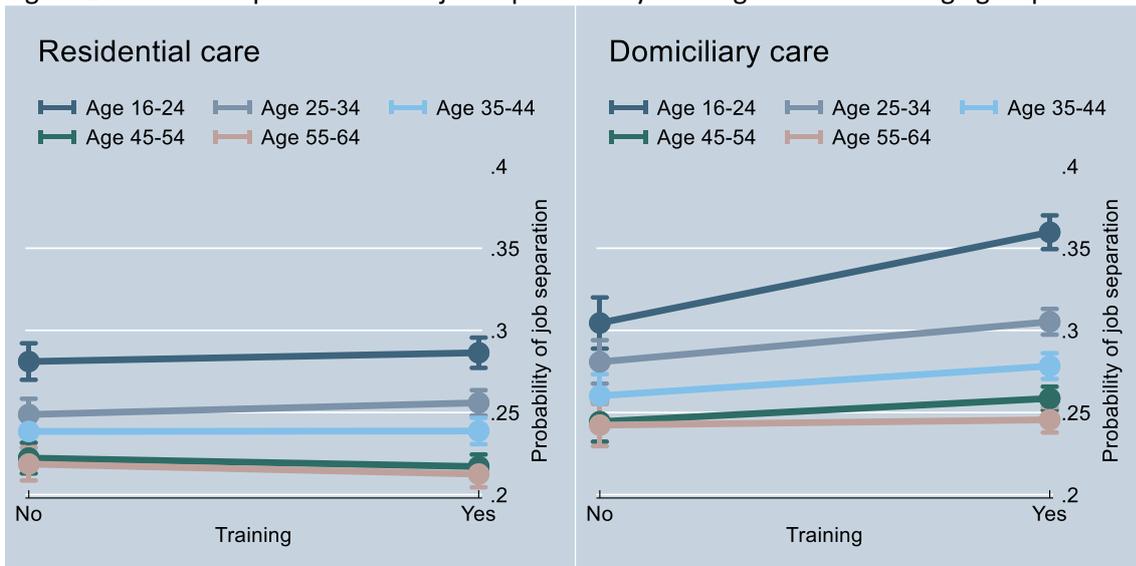
Data source: Adult Social Care Workforce Data Set (ASC-WDS); pooled Oct 2016, Oct 2017 and Oct 2018.

Table 1: Sample representativeness – establishment level

	Residential care						Domiciliary care					
	CQC directory			ASC-WDS sample			CQC directory			ASC-WDS sample		
	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018
Sector: Statutory LA	0.03	0.03	0.03	0.05	0.05	0.06	0.04	0.03	0.03	0.07	0.07	0.09
Sector: Private	0.81	0.82	0.82	0.77	0.78	0.80	0.83	0.85	0.86	0.80	0.81	0.81
Sector: Voluntary	0.16	0.15	0.15	0.19	0.17	0.15	0.13	0.12	0.11	0.13	0.12	0.11
Service type: Care home w/ nursing	0.27	0.27	0.28	0.28	0.29	0.33						
Service type: Care home w/o nursing	0.73	0.73	0.72	0.72	0.71	0.67						
Capacity (i.e. care home beds)	27.84	28.30	28.72	33.23	34.25	35.51						
CQC rating: No rating received	0.20	0.08	0.06	0.15	0.05	0.04	0.53	0.30	0.25	0.36	0.13	0.09
CQC rating: Inadequate/Req. improvement	0.23	0.20	0.18	0.20	0.17	0.16	0.10	0.12	0.11	0.12	0.13	0.09
CQC rating: Good/Outstanding	0.57	0.73	0.76	0.65	0.79	0.80	0.37	0.58	0.64	0.52	0.74	0.82
Region: East	0.11	0.11	0.11	0.13	0.13	0.13	0.12	0.12	0.12	0.12	0.12	0.11
Region: East Midlands	0.10	0.10	0.10	0.09	0.10	0.09	0.09	0.09	0.10	0.07	0.07	0.07
Region: London	0.09	0.09	0.09	0.06	0.05	0.04	0.14	0.15	0.16	0.10	0.10	0.10
Region: North East	0.05	0.05	0.05	0.06	0.06	0.06	0.04	0.03	0.03	0.05	0.06	0.05
Region: North West	0.12	0.12	0.12	0.12	0.12	0.11	0.12	0.12	0.11	0.14	0.15	0.14
Region: South East	0.19	0.19	0.19	0.17	0.17	0.17	0.16	0.16	0.16	0.17	0.16	0.17
Region: South West	0.14	0.13	0.13	0.13	0.13	0.15	0.11	0.10	0.10	0.12	0.11	0.12
Region: West Midlands	0.11	0.11	0.11	0.12	0.12	0.13	0.13	0.13	0.13	0.12	0.12	0.12
Region: Yorkshire and the Humber	0.10	0.10	0.09	0.12	0.13	0.13	0.09	0.09	0.09	0.10	0.11	0.11
Observations	16,385	16,073	15,780	4,635	4,295	3,653	8,100	8,369	8,800	1,757	1,750	1,567

Source: Care Quality Commission care directory; Adult Social Care Workforce Data Set (ASC-WDS).

Table 2: Descriptive statistics – direct care staff aged 16-64 by care setting; pooled ASC-WDS data (Oct 2016, Oct 2017 and Oct 2018)

	Residential care			Domiciliary care		
	Stayer	Leaver		Stayer	Leaver	
	Mean	Mean	diff	Mean	Mean	diff
Sick days (last 12 months)	3.640	4.401	-0.761 ***	2.855	3.487	-0.632 ***
Age	41.252	37.355	3.897 ***	42.808	39.184	3.624 ***
Gender: female	0.864	0.845	0.019 ***	0.868	0.877	-0.009 ***
Nationality: British	0.828	0.809	0.018 ***	0.855	0.847	0.008 ***
Distance to work (km)	2.990	3.594	-0.604 ***	6.183	7.058	-0.875 ***
Qualification: yes	0.658	0.537	0.121 ***	0.537	0.461	0.076 ***
Training (any): yes	0.590	0.553	0.037 ***	0.669	0.682	-0.013 ***
Job tenure (years)	6.289	4.315	1.975 ***	5.120	3.821	1.299 ***
Job role: senior care worker	0.173	0.136	0.037 ***	0.058	0.041	0.016 ***
Job role: care worker	0.807	0.846	-0.040 ***	0.879	0.907	-0.028 ***
Job role: other care-providing	0.021	0.018	0.003 ***	0.064	0.052	0.012 ***
Hourly wage (2015 £)	7.701	7.549	0.152 ***	7.892	7.855	0.037 ***
Zero hours contract	0.025	0.063	-0.037 ***	0.603	0.637	-0.034 ***
Full-time	0.591	0.570	0.021 ***	0.489	0.472	0.017 ***
Sector: statutory LA	0.032	0.020	0.012 ***	0.036	0.029	0.007 ***
Sector: private (i.e. for-profit)	0.826	0.872	-0.046 ***	0.819	0.864	-0.045 ***
Sector: voluntary (i.e. not-for-profit)	0.142	0.108	0.034 ***	0.145	0.107	0.038 ***
Care type: care home w/ nursing	0.392	0.416	-0.024 ***			
Care type: care home w/o nursing	0.608	0.584	0.024 ***			
User type: old age	0.511	0.530	-0.019 ***	0.080	0.071	0.009 ***
User type: young adults	0.259	0.250	0.009 ***	0.143	0.119	0.024 ***
User type: mixed	0.230	0.220	0.010 ***	0.777	0.810	-0.033 ***
Staff size: micro/small (1-49 workers)	0.551	0.543	0.008 ***	0.258	0.297	-0.039 ***
Staff size: medium/large (50+ workers)	0.449	0.457	-0.008 ***	0.742	0.703	0.039 ***
Turnover rate	0.311	0.341	-0.030 ***	0.414	0.464	-0.050 ***
Vacancy rate	0.035	0.039	-0.004 ***	0.060	0.069	-0.009 ***
Care worker per SU ratio	2.426	2.203	0.223 ***	1.705	1.573	0.132 ***
CQC rating Well-led: Inadequate/Req improvement	0.233	0.264	-0.031 ***	0.155	0.151	0.004 *
CQC rating Well-led: Good/Outstanding	0.670	0.635	0.035 ***	0.546	0.521	0.024 ***
CQC rating Well-led: No rating received	0.096	0.101	-0.004 **	0.299	0.328	-0.028 ***
Unemployment rate (LA level; ONS)	4.548	4.481	0.067 ***	4.836	4.710	0.126 ***
Average female wage (LA-level; ASHE)	12.892	12.877	0.015 *	13.207	13.174	0.032 **
Average house price (postcode district; 2015 £)	201,245	204,904	-3,659 ***	209,474	208,729	744
Urban location	0.862	0.861	0.001	0.894	0.885	0.009 ***
ASC Unit Costs Res. Care (LA level; £/week; 2015 £)	701.16	705.74	-4.58 ***	708.24	704.03	4.21 ***
ASC Unit Costs Dom. Care (LA level; £/hour; 2015 £)	15.10	15.17	-0.08 ***	14.88	14.86	0.02 *
Care home competition (distance-weighted Herfindahl-Hirschman Index (HHI))	0.017	0.018	-0.001 ***	0.015	0.016	-0.001 ***
Year: 2016	0.336	0.374	-0.038 ***	0.313	0.348	-0.036 ***
Year: 2017	0.343	0.348	-0.006 **	0.329	0.336	-0.008 **
Year: 2018	0.321	0.278	0.043 ***	0.359	0.315	0.043 ***
Region: Eastern	0.105	0.110	-0.004 ***	0.098	0.103	-0.005 ***
Region: East Midlands	0.103	0.104	-0.001	0.114	0.114	0.000
Region: London	0.077	0.072	0.005 ***	0.171	0.134	0.037 ***
Region: North East	0.061	0.048	0.013 ***	0.072	0.064	0.008 ***
Region: North West	0.131	0.122	0.009 ***	0.140	0.148	-0.007 ***
Region: South East	0.177	0.185	-0.009 ***	0.129	0.141	-0.012 ***
Region: South West	0.118	0.137	-0.019 ***	0.087	0.101	-0.014 ***
Region: West Midlands	0.119	0.120	-0.001	0.103	0.103	0.000
Region: Yorkshire and the Humber	0.109	0.101	0.008 ***	0.086	0.092	-0.006 ***
Observations (max)	152,247	47,143		113,123	42,642	

Significance level: *** p<0.01, ** p<0.05, * p<0.1

Table 3: Estimation results of job separation – residential care

VARIABLES	(1) logit Odd ratios	(2) logit ME	(3) probit ME	(4) LPM/OLS β	(5) CRE probit ME	(6) FE LPM β	(7) WB-MEM β
Age	0.969***	-0.005***	-0.006***	-0.008***	-0.005***		
	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)		
Age squared (x 1,000)	1,000.000***	0.044***	0.052***	0.069***	0.045***		
	(0.040)	(0.001)	(0.001)	(0.001)	(0.001)		
Female	0.892***	-0.020***	-0.020***	-0.020***	-0.014***		
	(0.015)	(0.003)	(0.003)	(0.003)	(0.003)		
Nationality: British	0.953***	-0.008***	-0.009***	-0.009***	-0.034	-0.056**	-0.056*
	(0.015)	(0.003)	(0.003)	(0.003)	(0.032)	(0.029)	(0.033)
Distance from work (km; log)	1.183***	0.029***	0.029***	0.030***	0.042***	0.054***	0.054***
	(0.009)	(0.001)	(0.001)	(0.001)	(0.011)	(0.012)	(0.011)
Qualification: yes	0.842***	-0.029***	-0.030***	-0.034***	-0.016**	0.017**	0.017**
	(0.010)	(0.002)	(0.002)	(0.002)	(0.008)	(0.008)	(0.008)
Training (any): yes	0.929***	-0.012***	-0.012***	-0.014***	0.000	0.019***	0.019***
	(0.011)	(0.002)	(0.002)	(0.002)	(0.007)	(0.007)	(0.007)
Tenure (years)	0.883***	-0.021***	-0.021***	-0.020***	-0.042***		
	(0.003)	(0.001)	(0.001)	(0.000)	(0.001)		
Tenure (years) squared	1.003***	0.001***	0.001***	0.001***	0.001***		
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		
Job role: care worker	0.884***	-0.021***	-0.020***	-0.018***	-0.001	-0.014*	-0.014*
	(0.016)	(0.003)	(0.003)	(0.003)	(0.008)	(0.008)	(0.008)
Job role: other care-providing	0.877***	-0.023***	-0.020***	-0.020***	0.012	-0.007	-0.007
	(0.037)	(0.007)	(0.007)	(0.007)	(0.023)	(0.020)	(0.023)
Hourly wage (log; 2015 £)	0.429***	-0.144***	-0.132***	-0.122***	-0.282***	-0.207***	-0.207***
	(0.030)	(0.012)	(0.011)	(0.010)	(0.030)	(0.027)	(0.029)
Zero-hours contract	2.025***	0.120***	0.126***	0.155***	0.125***	0.179***	0.179***
	(0.054)	(0.005)	(0.005)	(0.006)	(0.014)	(0.017)	(0.014)
Full-time	0.917***	-0.015***	-0.015***	-0.015***	-0.026***	-0.026***	-0.026***
	(0.011)	(0.002)	(0.002)	(0.002)	(0.007)	(0.007)	(0.008)
Sector: Private	1.109***	0.018***	0.016***	0.014***	0.009*		
	(0.037)	(0.006)	(0.005)	(0.005)	(0.005)		

VARIABLES	(1) logit Odd ratios	(2) logit ME	(3) probit ME	(4) LPM/OLS β	(5) CRE probit ME	(6) FE LPM β	(7) WB-MEM β
Sector: Voluntary	0.916**	-0.014**	-0.015***	-0.018***	-0.020***		
	(0.032)	(0.006)	(0.006)	(0.005)	(0.005)		
Care setting: CH w/o nursing	1.011	0.002	0.001	0.001	-0.003		
	(0.014)	(0.002)	(0.002)	(0.002)	(0.002)		
User type: young adults	0.975*	-0.004*	-0.003	-0.005**	-0.001	-0.016	-0.016
	(0.015)	(0.003)	(0.003)	(0.003)	(0.040)	(0.036)	(0.041)
User type: mixed	0.964***	-0.006***	-0.006**	-0.007***	0.003	0.006	0.006
	(0.013)	(0.002)	(0.002)	(0.002)	(0.019)	(0.018)	(0.018)
Staff size: medium/large (50+ workers)	0.941***	-0.010***	-0.012***	-0.010***	-0.012*	-0.011*	-0.011
	(0.012)	(0.002)	(0.002)	(0.002)	(0.007)	(0.006)	(0.007)
Turnover rate	1.136***	0.022***	0.022***	0.023***	-0.006	-0.004	-0.004
	(0.018)	(0.003)	(0.003)	(0.003)	(0.006)	(0.006)	(0.006)
Vacancy rate	1.242***	0.037***	0.037***	0.041***	0.021	0.049**	0.049**
	(0.098)	(0.013)	(0.014)	(0.014)	(0.025)	(0.024)	(0.025)
Care worker per SU ratio	0.995***	-0.001***	-0.001***	-0.001***	-0.000	-0.000	-0.000
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
CQC rating (Well-led): Good/Outstanding	0.869***	-0.024***	-0.025***	-0.025***	-0.019***	-0.018***	-0.018***
	(0.012)	(0.002)	(0.002)	(0.002)	(0.004)	(0.004)	(0.004)
CQC rating (Well-led): Not rated	0.859***	-0.026***	-0.026***	-0.027***	-0.013**	-0.015***	-0.015***
	(0.021)	(0.004)	(0.004)	(0.004)	(0.006)	(0.005)	(0.006)
Unemployment rate (LA level)	1.013**	0.002**	0.002**	0.002**	0.001	0.006***	0.006**
	(0.006)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Mean female wage (LA level; 2015 £)	0.972	-0.005	-0.007	-0.005	-0.036	-0.052*	-0.052
	(0.066)	(0.012)	(0.012)	(0.012)	(0.031)	(0.029)	(0.032)
House price (Postcode district level; log; 2015 £)	1.070***	0.011***	0.011***	0.010***	0.015	0.048	0.048
	(0.024)	(0.004)	(0.004)	(0.004)	(0.033)	(0.031)	(0.033)
Urban	1.061***	0.010***	0.011***	0.010***	0.007***		
	(0.017)	(0.003)	(0.003)	(0.003)	(0.003)		
ASC Unit Costs Residential Care (LA level; log; £/week)	1.217***	0.033***	0.033***	0.033***	-0.063***	-0.034**	-0.034*
	(0.057)	(0.008)	(0.008)	(0.008)	(0.018)	(0.017)	(0.018)
ASC Unit Costs Domiciliary Care (LA level; log; £/hour)	1.099	0.016	0.016	0.016	0.035**	0.043***	0.043***
	(0.068)	(0.011)	(0.011)	(0.011)	(0.016)	(0.015)	(0.016)

VARIABLES	(1) logit Odd ratios	(2) logit ME	(3) probit ME	(4) LPM/OLS β	(5) CRE probit ME	(6) FE LPM β	(7) WB-MEM β
Care home competition (distance-weighted HHI)	1.671	0.088	0.094	0.081	2.965**	1.677	1.677
	(0.640)	(0.065)	(0.065)	(0.066)	(1.246)	(1.083)	(1.122)
Year	yes	yes	yes	yes	yes	yes	yes
Region	yes	yes	yes	yes	yes		
Constant	0.813			0.432***		0.116	1.060***
	(0.321)			(0.066)		(0.403)	(0.124)
Observations	199,390	199,390	199,390	199,390	199,390	199,390	199,390
No. of job spells (level 2 groups)						118,503	118,503
No. of establishments (level 3 groups)							5,856
R-sq; Pseudo R-sq	0.051	0.051	0.051	0.054	0.199	0.180	
Log likelihood/pseudo-likelihood	-103,481	-103,481	-103,514		-87,322		-88,956
Hausman test FE vs. RE (chi-sq)/ F-test of $\bar{x}_{ij} = 0$					30,378***	24,189***	
LR test mixed vs. non-mixed model (chi-sq)							15,745***
Sigma ui						0.471	
Sigma eij						0.292	
Rho						0.722	
Intraclass correlation: establishment							0.206
Intraclass correlation: job spell | establishment							0.431

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Base categories: Nationality: Other; Qualification: no qualification; Training: no training received; Job role: senior care worker; Sector: statutory LA; User type: old age; Care setting: care home with nursing; Staff size: micro/small (1-49 workers); CQC rating: Inadequate/Requires improvement. LPM: linear probability model; CRE: conditional random effects; FE: fixed effects; WB-MEM: within-between mixed effects model.

Table 4: Estimation results of job separation – domiciliary care

VARIABLES	(1) logit Odd ratios	(2) logit ME	(3) probit ME	(4) LPM/OLS β	(5) CRE probit ME	(6) FE LPM β	(7) WB-MEM β
Age	0.952***	-0.009***	-0.010***	-0.011***	-0.008***		
	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)		
Age squared (x 1,000)	1,000.000***	0.081***	0.087***	0.103***	0.065***		
	(0.041)	(0.001)	(0.001)	(0.001)	(0.001)		
Female	0.982	-0.003	-0.004	-0.003	-0.001		
	(0.018)	(0.004)	(0.004)	(0.003)	(0.003)		
Nationality: British	0.900***	-0.020***	-0.020***	-0.021***	-0.018	-0.017	-0.017
	(0.017)	(0.004)	(0.004)	(0.004)	(0.019)	(0.017)	(0.023)
Distance from work (km; log)	1.155***	0.027***	0.027***	0.027***	-0.002	-0.003	-0.003
	(0.009)	(0.001)	(0.001)	(0.001)	(0.010)	(0.010)	(0.010)
Qualification: yes	0.957***	-0.008***	-0.009***	-0.010***	-0.016*	0.004	0.004
	(0.012)	(0.002)	(0.002)	(0.003)	(0.008)	(0.008)	(0.009)
Training (any): yes	1.049***	0.009***	0.009***	0.009***	0.018**	0.033***	0.033***
	(0.014)	(0.003)	(0.003)	(0.003)	(0.008)	(0.008)	(0.008)
Tenure (years)	0.879***	-0.024***	-0.024***	-0.023***	-0.052***		
	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)		
Tenure (years) squared	1.003***	0.001***	0.001***	0.001***	0.002***		
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		
Job role: care worker	1.114***	0.020***	0.020***	0.018***	0.032**	0.021	0.021
	(0.033)	(0.005)	(0.005)	(0.005)	(0.013)	(0.013)	(0.015)
Job role: other care-providing	1.079**	0.014**	0.014**	0.013**	0.044**	0.026	0.026
	(0.041)	(0.007)	(0.007)	(0.006)	(0.021)	(0.019)	(0.022)
Hourly wage (log; 2015 £)	0.667***	-0.077***	-0.075***	-0.067***	-0.277***	-0.229***	-0.229***
	(0.044)	(0.012)	(0.012)	(0.011)	(0.031)	(0.028)	(0.031)
Zero-hours contract	1.069***	0.013***	0.013***	0.013***	0.030**	0.029**	0.029**
	(0.016)	(0.003)	(0.003)	(0.003)	(0.012)	(0.012)	(0.012)
Full-time	0.924***	-0.015***	-0.015***	-0.015***	-0.043***	-0.047***	-0.047***
	(0.011)	(0.002)	(0.002)	(0.002)	(0.010)	(0.010)	(0.011)
Sector: Private	0.824***	-0.038***	-0.037***	-0.037***	-0.042***		
	(0.025)	(0.006)	(0.006)	(0.005)	(0.006)		

VARIABLES	(1) logit Odd ratios	(2) logit ME	(3) probit ME	(4) LPM/OLS β	(5) CRE probit ME	(6) FE LPM β	(7) WB-MEM β
Sector: Voluntary	0.704***	-0.067***	-0.065***	-0.064***	-0.064***		
	(0.024)	(0.007)	(0.006)	(0.006)	(0.006)		
User type: young adults	0.865***	-0.026***	-0.026***	-0.025***	0.242***	0.307***	0.307***
	(0.027)	(0.006)	(0.006)	(0.006)	(0.064)	(0.072)	(0.067)
User type: mixed	1.044*	0.008*	0.008*	0.009*	0.106***	0.169***	0.169***
	(0.026)	(0.005)	(0.005)	(0.005)	(0.035)	(0.048)	(0.047)
Staff size: medium/large (50+ workers)	0.901***	-0.020***	-0.020***	-0.021***	-0.043***	-0.032***	-0.032***
	(0.013)	(0.003)	(0.003)	(0.003)	(0.008)	(0.007)	(0.008)
Turnover rate	1.175***	0.031***	0.030***	0.033***	-0.011**	0.004	0.004
	(0.015)	(0.002)	(0.002)	(0.003)	(0.004)	(0.004)	(0.005)
Vacancy rate	1.262***	0.044***	0.044***	0.046***	0.027	0.007	0.007
	(0.071)	(0.011)	(0.011)	(0.011)	(0.024)	(0.024)	(0.025)
Care worker per SU ratio	1.004***	0.001***	0.001***	0.001***	-0.001	-0.001	-0.001
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
CQC rating (Well-led): Good/Outstanding	0.956***	-0.009***	-0.009***	-0.008**	-0.007	-0.006	-0.006
	(0.016)	(0.003)	(0.003)	(0.003)	(0.005)	(0.005)	(0.005)
CQC rating (Well-led): Not rated	1.093***	0.017***	0.018***	0.019***	0.004	-0.007	-0.007
	(0.023)	(0.004)	(0.004)	(0.004)	(0.006)	(0.005)	(0.006)
Unemployment rate (LA level)	0.954***	-0.009***	-0.009***	-0.009***	0.005**	0.009***	0.009***
	(0.006)	(0.001)	(0.001)	(0.001)	(0.003)	(0.002)	(0.003)
Mean female wage (LA level; 2015 £)	1.909***	0.122***	0.122***	0.123***	-0.125***	-0.078**	-0.078**
	(0.129)	(0.013)	(0.013)	(0.013)	(0.036)	(0.035)	(0.037)
House price (Postcode district level; log; 2015 £)	1.066***	0.012***	0.012***	0.011***	0.055**	0.054**	0.054**
	(0.025)	(0.004)	(0.004)	(0.004)	(0.022)	(0.021)	(0.024)
Urban	1.041**	0.008**	0.008**	0.007*	0.006		
	(0.021)	(0.004)	(0.004)	(0.004)	(0.004)		
ASC Unit Costs Residential Care (LA level; log; £/week)	1.221***	0.038***	0.037***	0.038***	-0.029	0.002	0.002
	(0.064)	(0.010)	(0.010)	(0.010)	(0.020)	(0.020)	(0.020)
ASC Unit Costs Domiciliary Care (LA level; log; £/hour)	0.707***	-0.065***	-0.064***	-0.063***	-0.098***	-0.104***	-0.104***
	(0.048)	(0.013)	(0.013)	(0.013)	(0.019)	(0.019)	(0.019)
Care home competition (distance-weighted HHI)	3.329***	0.227***	0.228***	0.241***	-0.578	0.565	0.565
	(1.197)	(0.068)	(0.069)	(0.073)	(0.639)	(0.717)	(0.693)

VARIABLES	(1) logit Odd ratios	(2) logit ME	(3) probit ME	(4) LPM/OLS β	(5) CRE probit ME	(6) FE LPM β	(7) WB-MEM β
Year	yes	yes	yes	yes	yes	yes	yes
Region	yes	yes	yes	yes	yes		
Constant	0.319***			0.276***		0.158	0.619***
	(0.136)			(0.080)		(0.329)	(0.194)
Observations	155,765	155,765	155,765	155,765	155,765	155,765	155,765
No. of job spells (level 2 groups)						92,780	92,780
No. of establishments (level 3 groups)							2,456
R-sq; Pseudo R-sq	0.042	0.042	0.042	0.048	0.204	0.208	
Log likelihood/pseudo-likelihood	-87,586	-87,586	-87,609		-72,818		-71,460
Hausman test FE vs. RE (chi-sq)/ F-test of $\bar{z}_{ij} = 0$					25,909***	22,490***	
LR test mixed vs. non-mixed model (chi-sq)							21,741***
Sigma ui						0.501	
Sigma eij						0.309	
Rho						0.724	
Intraclass correlation: establishment							0.288
Intraclass correlation: job spell | establishment							0.447

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Base categories: Nationality: Other; Qualification: no qualification; Training: no training received; Job role: senior care worker; Sector: statutory LA; User type: old age; Staff size: micro/small (1-49 workers); CQC rating: Inadequate/Requires improvement. LPM: linear probability model; CRE: conditional random effects; FE: fixed effects; WB-MEM: within-between mixed effects model.

Table 5: Analysis of sick days

	Residential care					Domiciliary care				
	(1)	(2)	(3)		(4)	(1)	(2)	(3)		(4)
				Job separation	Job separation				Job separation	Job separation
	Sick days	Sick days	Sick days			Sick days	Sick days	Sick days		
			CMP					CMP		
	tobit	CRE tobit	CRE tobit	CRE probit	CRE probit	tobit	CRE tobit	CRE tobit	CRE probit	CRE probit
VARIABLES	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME
Days-sick (log) in last 12 months					0.019***					0.002
					(0.003)					(0.003)
Age	-0.010***	-0.009***	-0.009***	-0.006***	-0.006***	-0.002	-0.001	-0.001	-0.008***	-0.008***
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
Age squared (x 1,000)	0.090***	0.078***	0.078***	0.048***	0.049***	-0.001	-0.019	-0.018	0.066***	0.066***
	(0.027)	(0.027)	(0.027)	(0.001)	(0.001)	(0.028)	(0.028)	(0.028)	(0.001)	(0.001)
Female	0.055***	0.059***	0.059***	-0.011***	-0.010***	0.121***	0.122***	0.122***	0.003	0.005
	(0.012)	(0.012)	(0.012)	(0.003)	(0.003)	(0.013)	(0.013)	(0.013)	(0.004)	(0.004)
Nationality: British	0.196***	-0.078	-0.078	-0.055	-0.054	0.089***	-0.051	-0.051	-0.013	-0.013
	(0.012)	(0.099)	(0.099)	(0.041)	(0.041)	(0.013)	(0.031)	(0.031)	(0.020)	(0.020)
Distance from work (km; log)	0.019***	-0.011	-0.010	0.024	0.024	-0.031***	-0.004	-0.004	0.025**	0.026**
	(0.006)	(0.044)	(0.044)	(0.017)	(0.017)	(0.005)	(0.022)	(0.022)	(0.013)	(0.013)
Qualification: yes	0.002	0.086***	0.086***	-0.017*	-0.019*	0.055***	0.065***	0.063***	0.003	0.003
	(0.009)	(0.023)	(0.022)	(0.010)	(0.010)	(0.010)	(0.019)	(0.019)	(0.010)	(0.010)
Training (any): yes	0.013	-0.002	-0.003	-0.009	-0.008	0.159***	-0.020	-0.021	0.020*	0.021*
	(0.009)	(0.018)	(0.018)	(0.010)	(0.010)	(0.010)	(0.022)	(0.022)	(0.012)	(0.012)
Tenure (years)	0.061***	0.055***	0.055***	-0.038***	-0.037***	0.064***	0.060***	0.061***	-0.046***	-0.046***
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
Tenure (years) squared	-0.002***	-0.002***	-0.002***	0.001***	0.001***	-0.002***	-0.002***	-0.002***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Job role: care worker	0.086***	0.020	0.020	-0.002	-0.003	0.059***	0.026	0.027	0.032**	0.033**
	(0.011)	(0.021)	(0.021)	(0.011)	(0.011)	(0.017)	(0.030)	(0.030)	(0.016)	(0.016)
Job role: other care-providing	-0.006	0.021	0.020	0.029	0.030	0.014	-0.052	-0.052	0.072***	0.073***
	(0.025)	(0.062)	(0.062)	(0.029)	(0.029)	(0.021)	(0.044)	(0.044)	(0.026)	(0.026)
Hourly wage (log; 2015 £)	0.221***	0.283***	0.283***	-0.175***	-0.183***	0.210***	0.337***	0.335***	-0.298***	-0.301***
	(0.041)	(0.072)	(0.072)	(0.038)	(0.038)	(0.038)	(0.064)	(0.063)	(0.038)	(0.038)

VARIABLES	Residential care					Domiciliary care				
	(1)	(2)	(3)	(4)		(1)	(2)	(3)	(4)	
				Job separation	Job separation				Job separation	Job separation
	Sick days	Sick days	Sick days			Sick days	Sick days	Sick days		
			CMP					CMP		
	tobit	CRE tobit	CRE tobit	CRE probit	CRE probit	tobit	CRE tobit	CRE tobit	CRE probit	CRE probit
	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME
Zero-hours contract	-0.235***	-0.197***	-0.196***	0.139***	0.141***	-0.120***	-0.141***	-0.141***	0.070***	0.070***
	(0.023)	(0.050)	(0.050)	(0.021)	(0.021)	(0.010)	(0.033)	(0.032)	(0.015)	(0.015)
Full-time	-0.018**	0.048**	0.048**	-0.041***	-0.042***	0.030***	0.003	0.003	-0.046***	-0.046***
	(0.009)	(0.023)	(0.023)	(0.011)	(0.011)	(0.009)	(0.028)	(0.028)	(0.012)	(0.012)
Sector: Private	-0.664***	-0.680***	-0.681***	-0.001	-0.008	-0.572***	-0.587***	-0.587***	-0.034***	-0.043***
	(0.025)	(0.026)	(0.026)	(0.006)	(0.006)	(0.024)	(0.025)	(0.025)	(0.007)	(0.007)
Sector: Voluntary	-0.659***	-0.667***	-0.668***	-0.021***	-0.027***	-0.494***	-0.503***	-0.503***	-0.041***	-0.049***
	(0.025)	(0.026)	(0.026)	(0.006)	(0.006)	(0.025)	(0.026)	(0.026)	(0.008)	(0.007)
Care setting: CH w/o nursing	-0.113***	-0.106***	-0.106***	0.011***	0.010***					
	(0.010)	(0.010)	(0.010)	(0.003)	(0.003)					
User type: young adults	0.041***	-0.052	-0.052	0.027	0.030	0.123***	0.272	0.272	0.336***	0.338***
	(0.012)	(0.106)	(0.106)	(0.048)	(0.048)	(0.020)	(0.175)	(0.174)	(0.082)	(0.082)
User type: mixed	-0.062***	0.045	0.044	0.004	0.004	0.013	0.208**	0.206**	0.158***	0.158***
	(0.010)	(0.048)	(0.048)	(0.026)	(0.026)	(0.014)	(0.098)	(0.098)	(0.031)	(0.031)
Staff size: medium/large (50+ workers)	0.031***	0.071***	0.070***	-0.013	-0.014	-0.031***	0.023	0.022	-0.037***	-0.037***
	(0.009)	(0.017)	(0.017)	(0.010)	(0.010)	(0.009)	(0.015)	(0.015)	(0.009)	(0.009)
Turnover rate	0.023*	0.082***	0.082***	-0.004	-0.005	-0.018*	0.002	0.003	0.005	0.005
	(0.012)	(0.015)	(0.015)	(0.007)	(0.007)	(0.009)	(0.010)	(0.009)	(0.007)	(0.007)
Vacancy rate	0.868***	-0.053	-0.053	-0.002	-0.001	0.219***	0.159***	0.157***	-0.018	-0.019
	(0.051)	(0.066)	(0.066)	(0.033)	(0.033)	(0.038)	(0.047)	(0.047)	(0.028)	(0.028)
Care worker per SU ratio	-0.042***	-0.003	-0.003	-0.001	-0.001	0.002***	0.004	0.004	-0.001	-0.001
	(0.001)	(0.004)	(0.004)	(0.001)	(0.001)	(0.000)	(0.003)	(0.003)	(0.002)	(0.002)
CQC rating (Well-led): Good/Outstanding	0.007	-0.006	-0.007	-0.032***	-0.032***	0.023**	0.003	0.003	0.003	0.003
	(0.009)	(0.008)	(0.008)	(0.005)	(0.005)	(0.011)	(0.009)	(0.009)	(0.006)	(0.006)
CQC rating (Well-led): Not rated	0.008	-0.017	-0.018	-0.013	-0.011	-0.018	-0.011	-0.011	0.023***	0.023***
	(0.014)	(0.012)	(0.012)	(0.008)	(0.008)	(0.012)	(0.009)	(0.009)	(0.007)	(0.007)
Unemployment rate (LA level)	-0.022***	-0.010*	-0.010*	0.005*	0.005*	-0.019***	-0.007	-0.007	0.013***	0.013***
	(0.004)	(0.005)	(0.005)	(0.003)	(0.003)	(0.004)	(0.005)	(0.005)	(0.003)	(0.003)

	Residential care					Domiciliary care				
	(1)	(2)	(3)	(4)	(4)	(1)	(2)	(3)	(4)	(4)
				Job separation	Job separation				Job separation	Job separation
	Sick days	Sick days	Sick days			Sick days	Sick days	Sick days		
			CMP					CMP		
	tobit	CRE tobit	CRE tobit	CRE probit	CRE probit	tobit	CRE tobit	CRE tobit	CRE probit	CRE probit
VARIABLES	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME
Mean female wage (LA level; 2015 £)	0.109**	0.153**	0.152**	0.001	-0.003	-0.295***	0.099	0.102	-0.138***	-0.140***
	(0.047)	(0.069)	(0.069)	(0.042)	(0.042)	(0.046)	(0.068)	(0.068)	(0.045)	(0.045)
House price (Postcode district level; log; 2015 £)	-0.007	-0.292***	-0.290***	0.108**	0.112**	-0.009	-0.056	-0.058	0.054**	0.054**
	(0.016)	(0.076)	(0.076)	(0.044)	(0.044)	(0.016)	(0.048)	(0.048)	(0.026)	(0.026)
Urban	0.003	0.004	0.004	0.007**	0.007**	0.153***	0.155***	0.155***	0.005	0.007
	(0.012)	(0.012)	(0.012)	(0.003)	(0.003)	(0.015)	(0.015)	(0.015)	(0.004)	(0.004)
ASC Unit Costs Residential Care (LA level; log; £/week)	-0.147***	0.075*	0.074*	-0.122***	-0.122***	0.111***	0.018	0.014	-0.011	-0.011
	(0.033)	(0.040)	(0.039)	(0.023)	(0.023)	(0.033)	(0.033)	(0.033)	(0.024)	(0.024)
ASC Unit Costs Domiciliary Care (LA level; log; £/hour)	0.048	0.054	0.054	0.018	0.017	0.174***	0.101***	0.101***	-0.095***	-0.095***
	(0.042)	(0.033)	(0.033)	(0.022)	(0.022)	(0.037)	(0.024)	(0.024)	(0.022)	(0.022)
Care home competition (distance-weighted HHI)	-1.351***	-0.109	-0.124	3.955***	3.916***	0.816***	-0.657	-0.641	-0.282	-0.286
	(0.274)	(2.025)	(2.020)	(1.497)	(1.496)	(0.208)	(0.803)	(0.798)	(0.662)	(0.665)
Year	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Region	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
var(e.lnDAYSSICK)	4.536***	4.505***				5.637***	5.617***			
	(0.034)	(0.034)				(0.053)	(0.053)			
lnsig_1			0.753***					0.863***		
			(0.004)					(0.005)		
atanhrho_12			-0.061***					-0.071***		
			(0.011)					(0.013)		
Observations	125,175	125,175	125,175	125,175	125,175	100,734	100,734	100,734	100,734	100,734
Left-censored (=0)	74,171	74,171				68,690	68,690			
Pseudo R-sq	0.0285	0.0306			0.188	0.0554	0.0563			0.208
F-test of $\bar{z}_{ij} = 0$		35.97***			16,512***		12.71***			16,333***

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Base categories: Nationality: Other; Qualification: no qualification; Training: no training received; Job role: senior care worker; Sector: statutory LA; User type: old age; Care setting: care home with nursing; Staff size: micro/small (1-49 workers); CQC rating: Inadequate/Requires improvement. CRE: conditional random effects; CMP: conditional mixed-process multi-equation.