

Title: Carers time use: Preliminary findings from time use diaries

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Abstract:

'Unpaid care for older people: a study of carers' time' is a project funded by the Economic and Social Research Council through the Centre for Population Change ('CPC-II'). The overall aim of the project is to improve our understanding of the patterns of carer time-use, in the context of changing patterns of unpaid care, to support the development of improved data collection in large-scale survey research, and to provide usable up-to-date data for exploring trends in caring for older people. Existing time use methods and existing large scale survey questions are, we will suggest, no longer fit for purpose in delivering data that can be used to inform policy development, as they do not capture much of what unpaid carers actually contribute. In the first stage of the project, qualitative interviews with 62 carers of older adults across Great Britain explored how care partnerships involving older people are operating in diverse policy contexts, and what carers do, in particular taking account of policy divergence in the devolved UK context, and identifying the impacts of trends which have emerged in previous research. The paper will highlight how the findings of the qualitative data have identified how unpaid carers now use their time, and some of the tasks that are new elements of their work. Working with a panel of carers, the paper will demonstrate how these findings have been used to design a time-use data collection tool in the form of an easy-to-use 'time use diary' available in paper, electronic and online versions specifically to collect information from carers about time that they spend caring and supporting. Time use diaries have been disseminated at sites across the UK between January and June 2017. The presentation will include preliminary analysis of the data collected using these diaries, with reflections on the diary method and implications for large-scale surveys.

Introduction

Unpaid care, sometimes called informal or family care, is a critical component in supporting and maintaining the quality of life of many older people across Europe and elsewhere. Against a backdrop of population ageing and spiralling publicly-provided health and social care costs, the need to encourage, support, and maintain levels of provision of unpaid care to older people could not be clearer.

Although different aspects of unpaid care have been of significant cross-disciplinary research interest, the contemporary contribution of unpaid carers to the support and care of older people is not well understood. The development of policy which

successfully secures the future contribution of unpaid carers in this context could be jeopardised as a result. This paper reports on a study that aims to provide policy makers with much-needed detail by developing a better understanding of what unpaid carers of older people are doing, and particularly, how they use their time.

This paper provides context and background information before describing the development of a time use data collection tool ('time use diary') as part of 'Unpaid care for older people: a study of carers' time', a project funded by the Economic and Social Research Council through the Centre for Population Change ('CPC-II'). The paper begins by outlining the changing context of unpaid care for older people. Following this, the paper argues that existing research, and in particular large scale survey data, tends not to provide systematic exploration of and effective tools for examining unpaid carers' support-related activities and how they use their time. It is argued that time use studies have potential to deliver more useful information, but that existing tools for time use data collection are not best suited to collecting information from this population. The development of a time use diary specifically for use with unpaid carers of older people is presented and its design is described.

The changing context of unpaid care for older people

Demographic changes are affecting both demand for and supply of unpaid care for older people. Countries across Europe and elsewhere are experiencing 'population ageing', i.e. rises in the proportions of their populations aged 65 and over. For example, the proportion of total population aged 65 or over in the EU-28 is projected to increase from an estimated 18.8% on 1 January 2015 to 20.4% by 2020 and 23.9% by 2030, with the proportion of those aged 80 or over projected to increase from 5.3% in 2015 to 7.1% of the population of the EU-28 by 2030 (Eurostat 2016). Modelling suggests that life expectancy in high income countries is set to continue to increase over the next 15 years for both men and women, with the 'gender gap' in terms of life expectancy closing in most cases (see, for example, Parr et al. 2016, Kontis et al. 2017).

The 'old-age dependency ratio' ('OADR'), a measure of population ageing defined as the number of people in a population aged 65 years and over ('the old') relative to the number of people aged 15-64 years ('people of working age'), was 28.8% for the EU-28 on 1 January 2015, i.e. around 4 people of working age for every person aged 65 or over (Eurostat 2016), and is projected to increase to 39.4% by 2030 and to 49.5% by 2050, i.e. around two people of working age for every person aged 65 or over, a trend repeated at national levels. (European Commission 2015). Arguably more relevant to the supply of care is the 'old-age unhealthy dependency ratio' ('UnHODR') suggested by Muszyńska and Rau (2012), i.e. the number of people aged 65 or over with disability or limiting chronic health conditions and who might therefore be expected to need support relative to the number of people of working age. Using SHARE data on activity limitations and Eurostat population projections allowing international migration for 13 countries, they projected a rise in the

UnHODR for this group from 14% in 2010, rising to 20% in 2030 before falling to 18% in 2050, i.e. from just over 7 people of working age for every older person with poor health in 2010 to 5 people in 2030, rising to 5.5 people in 2050.

An increase in numbers of older people does not automatically create additional demand for care in this population. However, across much of Europe, 'life expectancy' ('LE') has been rising faster than 'healthy life years expectancy' ('HLYE') and thus the expected period of time lived with chronic health conditions which limit normal activities has increased. For example, ONS (2016) reports that in the UK between 2009-2011 and 2013-15, although HLYE rose for males and remained constant for females, male LE at birth rose by 0.7 years to 79.2 years whilst the proportion of life spent in good health fell by 0.2% to 79.7% and female LE at birth rose by 0.4 years to 82.9 years with the proportion of life spent in good health falling by 0.3% to 77.1%. There is also evidence of recent reductions in HLYE in some countries, e.g. Bardi and Perini (2013) note reductions in HLYE in 10 European countries after 2003, and Atella et al (2017) found that the average period of life spent with chronic illness in Italy increased by 6.4 years between 2000 and 2014.

At the same time, changing family structures and dynamics are set to have an impact on the availability of unpaid care. Looking at changes in the UK, Williams (2004) identified changing household compositions due to increased incidence of single person households, cohabitation, separation, divorce, lone parenthood and step-families, increases in the average age at which women have their first child and reductions in average family sizes. Pickard and colleagues (Pickard et al. 2007, 2012, Pickard 2015) have modelled the effects of changing family structure in the UK, with projections highlighting the increasing importance of spousal care and the emergence of a 'care gap' as the demand for intense unpaid care from adult children exceeds supply (with a projected shortfall equivalent to 160,000 caregivers by 2032), leading to increasing reliance on more fragile relationships with wider kin and friends.

The availability of unpaid care is also affected by its competing demands and interactions with labour market participation, particularly by women who have traditionally provided unpaid care. Appelbaum et al. (2002) identified shifts in the organisation of paid and unpaid care in the United States resulting from increasing labour market participation by women, with Williams (2004) observing increasing labour market participation by women with dependent children in the UK. Tensions are particularly evidence for middle-aged women (see, for example, Spillman and Pezzin's (2000) discussion of a 'sandwich generation'), with Speiss and Schneider (2003) finding a primarily negative impact on hours of paid employment on women aged 45-59 in Europe of starting to provide care, Heitmüller and Michaud (2006) observing that informal caring negatively affected co-resident carers' employment rates, and Lilly, Laporte and Coyte's, (2007) systematic review of labour market participation and unpaid care concluding that only intensive caregivers were significantly more likely to withdraw from the labour market: other caregivers were as

likely to be in employment as non-caregivers, but more likely to work fewer paid hours.

Williams (2010) noted that policy development around unpaid care in Europe is framed around 'social justice' (recognition, rights and redistribution) and/or 'social investment' (employability, labour market activation), with framing and degree of emphasis influenced by political context.

Policy affects how and by whom care is provided. In considering how paid and unpaid care of older people mapped on to 'institutional' modes of provision in the Netherlands and Italy, Glucksmann and Lyon (2006) found two distinct configurations of care which related to differences in policy contexts. In the Netherlands, state service provision was seen to shape and anchor the family as the main provider and unpaid care was supported by state-funded voluntary sector provision. By contrast, in Italy there was limited public sector provision and whilst family care was sustained as an ideal, there was significant use of informal market-based services in the form of migrant carers. Bell and Bowes (2006) found shifts in the provision of unpaid care from personal care tasks to other tasks in response to the free personal care policy in Scotland, a policy which placed a duty on local authorities to provide personal care to older people with assessed care needs living in the community free of charge.

The distinctive attributes and attitudes of the 'babyboomer generation' are thought to be affecting the availability and nature of unpaid care. Bowes and Bell (2008) found changing attitudes to care in this cohort in the UK. Bowes and Bell also identified higher levels of education, new migration patterns of both carers and carees and increased housing wealth as factors affecting the provision of unpaid care.

Costs of care, both financial and human (e.g. caregiver stress), are significant. There are methodological issues in estimating the economic value of unpaid care (Francis and McDaid 2009), but estimates published by Carers UK have suggested values of £87 billion in 2007, £119 billion in 2011 and £132 billion in 2015 (Buckner and Yeandle 2007, 2011, 2015). Not all unpaid care included in these estimates would otherwise have been provided by the state, but unpaid care nonetheless provides significant public savings. Furthermore, providing unpaid care may have significant economic costs for the individuals and families concerned, affecting employment and consequently standards of living (Holzhausen and Pearlman 2000, King and Pickard 2013) as well as pensions (Ginn and Arber 2000, Evandrou and Glaser 2003, van Houtven et al 2013). There is also evidence of negative health impacts for unpaid carers (Christakis 2004, Iles 2003, Hirst, 2005, Vlachantoni et al 2016), who may seek additional, costly health care. Appropriate support for carers can ameliorate health impacts on carers, avoiding subsequent costs resulting from carer ill-health and leading to savings. For example, Gaugler et al (2003) found that adult day care for people with dementia could reduce family caregiver stress, reducing calls on

formal care services, and Mittelman et al (2006) found that a multi-component carer intervention delayed residential care placement by a median of 1.5 years.

Existing research on what unpaid carers do: methods and limitations

Existing research tends not to provide systematic exploration of and effective tools for examining unpaid carers' support-related activities and how they use their time. Large scale surveys and qualitative research designs have both been extensively used to research unpaid care, but both have limitations in terms of providing a full picture of what carers do.

Most large general surveys include questions on care, but many such questions tend to be highly structured, conflate all 'adult care', often provide relatively coarse-grained response options, and contain many assumptions about carers. Such surveys may not therefore be collecting data which can usefully inform the development of policy to support the provision of unpaid care to older people. For example, the 2011 Census in Scotland, Understanding Society (a UK panel survey) and SHARE (used in 27 European countries and in Israel) conflate unpaid care to a range of people in a range of circumstances, although the 2011 Census in Scotland and Understanding Society specifically limit consideration to care provided to others because of health conditions, disabilities or age-related problems. It is not possible to separate out care provided specifically to older people from the data collected.

Surveys rely on respondents to self-identify as carers. When describing the provision of unpaid care, the 2011 Census and Understanding Society questions do not mention 'care' at all, preferring a range of alternative terms. In Understanding Society different sets of terms are used when asking about provision of unpaid care to co-resident others ('look after or give special help to') and non co-resident others ('provide some regular service or help'. SHARE talks exclusively about helping with personal care in relation to co-resident others, but about personal care and non-personal help in relation to non co-resident people to whom the respondent is providing unpaid care.

Questions on unpaid care tend to have limited and quite coarse-grained ranges of responses. For example, in asking for estimates of time spent caring, the 2011 Scottish Census provides five response categories, the first positive category being '1-19 hours'. The personal and societal impacts of providing unpaid care at the lower and upper ends of that range are likely to be significantly different. By contrast, Understanding Society also invites estimation of total time spent provision unpaid care per week, but has ten response categories with three categories to cover up to 19 hours per week: 0-4, 5-9, and 10-19. SHARE does not ask for hours per week, but does ask about frequency of unpaid care to people not co-resident with the respondent, with four response categories: daily, weekly, monthly, less often. Respondents selecting the same frequency response category, e.g. daily but different intensities of care in terms of average minutes per day could be significantly

different impacted by providing care. Neither total time estimates nor indications of caring frequency help to illuminate temporal patterns of care provision and fluctuations in the intensity of care provided.

Table 1. Questions on provision of unpaid care in selected large surveys

Survey	Census 2011 (Scotland)*	Understanding Society – Module: caring_w4**	Survey of Health and Ageing in Europe (SHARE), Wave 6. Module: Social Support (SP)***
Survey respondents	All people of any age who are usually resident in Scotland on census night, national coverage, 94% response rate	All age panel survey with stratified, clustered, equal probability sample representative of the UK population, approx. 100,000 people.	Cross-national panel survey of individuals aged 50 or older across 27 European countries and Israel. 120,000 respondents (waves 1-6).
Question numbers / variable names	Individual, Qu. 9	caring_w4.aidhh Cares for sick/disabled/elderly in household caring_w4.aidxhh Non-residents cared for	SP018_GiveHelpInHH (Co-resident others) SP008_GiveHelp (Non co-resident others)
Activity description	'look after, or give any help or support to'	Co-residents: 'look after or give special help to' Non co-residents: 'provide some regular service or help'	Co-residents: 'helped regularly during the last twelve months with personal care, such as washing, getting out of bed, or dressing' Non co-residents: 'given any kind of help listed on [card 27]' (Card provides examples of personal care and non-personal help)
Recipient description	'family members, friends, neighbours or others'	Co-residents: 'anyone living with you' (examples provided) Non co-residents:	Co-residents: 'someone living in this household' Non co-residents: 'a family

Survey	Census 2011 (Scotland)*	Understanding Society – Module: caring_w4**	Survey of Health and Ageing in Europe (SHARE), Wave 6. Module: Social Support (SP)***
		‘any... person not living with you’	member from outside the household, a friend or neighbour’
Reasons for provision of help or care	because of either: • long-term physical / mental ill-health / disability; or • problems related to old age	Co-residents: ‘[person] is sick, disabled or elderly’ Non co-residents: ‘sick, disabled or elderly’	Co-residents: Implied: ‘By regularly we mean daily or almost daily during at least three months. We do not want to capture help during short-term sickness of family members.’ Non co-residents: Not specified.
Response options	Hours per week No 1 - 19 20 - 34 35 - 49 50 or more hours a week	Co-residents: Yes or No Non co-residents: Yes or No	Co-residents: Yes or No Non co-residents: Yes or No.
Follow-up questions	None	Co-residents: • Who is helped Non co-residents: • How many helped • Relationship(s) Total hours per week providing help (co-resident and non co-resident) – 10 response categories Effect of helping on paid employment	Co-residents: • Who is helped Non co-residents: • Relationship(s) • Type of help • Frequency of help Financial Transfers (FT) module: asks respondents about giving financial or material help or gifts to others.

* http://www.scotlandscensus.gov.uk/documents/Householdpre-addressed27_05_10specimen.pdf

** https://www.understandingsociety.ac.uk/documentation/mainstage/dataset-documentation/wave/4/questionnaire-module/caring_w4

*** http://www.share-project.org/fileadmin/pdf_questionnaire_wave_6/Generic_main_qnn_6_3_13.pdf

Qualitative studies can explore areas of interest in depth, generate rich data, and provide valuable insights into topics such as conceptualisations of care and experiences of care provision, but qualitative research tends to be small scale, and whilst it has raised important issues, has not yet addressed them fully.

Time use studies and unpaid care of older people

Time use research dates back to the mid-twentieth century in modern form, though some argue much earlier origins (Chenu and Lesnard, 2006). A number of methods of capturing time use data have been developed, including: questionnaire items; opportunity sampling ('beeper studies'); direct observation; and time use diaries, which typically collect both activity sequence and time budget data (Gershuny 2011).

Time use data have been used to explore patterns of activity and behaviour in a range of different contexts, such as work, leisure, travel and family life. There have been a number of studies related to paid and unpaid work such as housework and childcare, and time use data have been used in calculations of the value of unpaid care (e.g. Francavilla et al. 2010; Casey 2011; Giannelli et al. 2012) the measurement of national wellbeing (Gershuny 2011).

However, relatively few studies of the care of older people have been informed by time use surveys. Francavilla et al (2010: 33) asserted that there was 'no research on time spent with the elderly based on time use data, something they ascribed to paucity of detailed information captured by many European countries' time use surveys. Some time use surveys do not separately report care of older people, or fail to distinguish between different groups of adult recipients of unpaid care (Miranda 2011; Casey 2011). For example, although data is collected on adult care, due to the relatively small average number of observations the Harmonised European Time Use Surveys (HETUS) does not report this separately but aggregates it into a mixed time-use category called 'other domestic work' (Francavilla et al 2010). In addition, Keating et al (2014) suggest that despite being considered the 'gold standard' in terms of collecting data on the allocation of time to activities, time use surveys tend not to capture care tasks well. Keating et al attribute this to the often episodic nature of care-related activities and the difficulties in separating them from normal household tasks.

Although there are perceived weaknesses in current time use surveys in relation to gathering and report data on unpaid care of older people, they are still seen as important to developing a better understanding of unpaid care. Reviewing future developments in cross-national research on informal caregiving in a paper commissioned by the U.S. based National Institute on Aging (NIA), Litwin (2012) argued that 'There is need for greater specification of the extent and the essence of the informal caregiving experience' as provided by time use diaries and day recall methods (Kahneman et al. 2004).

A 'time use diary' specifically for use with unpaid carers of older people

Development

The development of the 'time use diary' was a multi-stage, iterative and collaborative process informed by carers' experiences and intended to ensure that the final version of the data collection tool was fit for purpose and met the needs of carers as potential participants in the research. The first stage in this process was to get a sense of the lives of contemporary carers of older people: open-ended interviews were conducted with a purposive sample of 62 carers of older people. Carers were located variously in England, Scotland and Wales. In recruiting participants, we stated that we were interested in speaking to 'people who provide unpaid care or support (sometimes called informal or family care or support) for older people' in order to avoid people self-selecting out of the study because they did not self-identify as providing 'care'.

The sample was not intended to be representative of carers in the UK: the aim was to capture experiences of providing care in a range of different circumstances and with differing national policy backgrounds. Just over fourth fifths of interviewed carers were female, one third lived with the person that they cared for or supported, and half described themselves as retired. The sample is described in terms of gender, interviewee residency status relative to the person cared for and employment status in Table 2.

Table 2. Interviewees described by gender, residency status and employment status

Characteristic	Category	Number of interviewees (number by gender)	% of all interviewees
Gender	Female	50	81
	Male	12	19
Residency status relative to person cared for	Co-resident	22 (16 F, 6 M)	35
	Not co-resident	40 (34 F*, 6 M)	65
Employment status	Employed	8 (6 F, 2M)	13

	Co-resident	Not employed [retired]	14 [12] <i>(10 [9] F, 4 [3] M)</i>	23 [19]
	Not co-resident	Employed	17 <i>(16 F, 1 M)</i>	27
		Not employed [retired]	23 [21] <i>(18 [16] F, 5 [5] M)</i>	37 [34]

The interviews allowed for in-depth qualitative exploration of contemporary carers' patterns of time use and support-related activities. In-depth findings from the interviews will be reported elsewhere, but these data informed the development of the time use data collection tool in a number of ways as described below.

First, the interviews highlighted similarities and differences in the context of individual interviewees' unpaid caregiving. For example, almost half of the interviewees (44%) experienced difficulties with one or more activities of daily living; nearly two-thirds (65%) were not co-resident so spent time travelling to and from the residence of the older person that they supported; more than half of those interviewed (52%) had scores from the 4-item screening version of the Zarit Burden screening Inventory (Bédard et al 2001) which suggest that they may be experiencing stress as a result of their care and support activities. These findings underlined the need to design a time use diary which was accessible, easy to use, and minimised the additional demand on carers' time resulting from participation in the study.

Second, a series of themes emerged which described the participants' conceptualisations of 'care' and 'support'. How these terms were conceptualised influenced interviewees' depictions of their activities and their accounts of time use. Their accounts moved away from the linear depictions of traditional time use diaries and suggest varying conceptualisations of time and temporality. Interview data suggested that the ways in which carers understand 'care' and 'support', carers' own classifications of activities and those of the people that they support, and divisions of labour relating to care activities are all likely to influence unpaid carers' perceptions of time use. This underscored the need to design a data collection tool flexible enough to accommodate different conceptualisations.

Third, interview data provided insight into a key aspects of activity definition. One aspect concerned whether the care and/or support in question was 'new' or was perceived to be a natural continuation of previous activities (see Keating et al. 2014). Activities perceived by carers to be the latter are less likely to be perceived as

provision of care or support. This is the case even when the division of labour in that activity had changed substantially, e.g. where a spousal carer takes increasing responsibility for an activity such as managing household finances that was previously shared, or the activity in question has become more onerous, e.g. where laundry has been the sole responsibility of the carer for an extended period, but the amount of laundry to be done has increased significantly because the person being supported now has issues with incontinence. The same preference for discounting activities as support-related and representing them rather as continuing normal activity was apparent in some interviews with people who perceived themselves as receiving a 'return' for caring because they found the tasks enjoyable, or they enjoyed the relationship with the older person that they supported. This highlighted the need to be explicit in terms of what uses of time the tool was designed to capture in order to avoid potential under-reporting of time use.

Fourth, when asked to describe the support that they provided very few interviewees gave a systematic account of a sequence of activities over a day, as would be collected through a time use diary. Many found the identification of specific tasks difficult, and spoke instead about accumulations of undefined small tasks or described their time use in overarching terms, e.g. 'time spent looking after everything'. A number of interviewees represented their support role as overwhelming and/or all-encompassing. For these carers, singling out activities did not correspond with their perception or lived experience of providing support. Such findings suggested that in order to both maximise data captured and allow for differences in how time spent caring was perceived the time use diary would need to find the optimal balance of structure and freedom to express a range of different representations of providing care and/or support.

In the next stage of the time use diary development process we recruited six people living locally to Stirling who care for an older person to a 'carers' panel'. The panel was tasked with discussing various aspects of the data collection tool design and use. Panel meetings were held in February and April 2016, with email and telephone contact with panel members before and after each meeting. Feedback from the panel during and after meetings was used to shape the continued development of the time use diary, with modified versions sent to the carers for feedback and, for the final version, piloting.

The first panel meeting focused on media for delivery of a time use diary. A commercially available tablet-based general time-use 'app' was demonstrated and the panel were asked to consider the possibility of a time use data collection tool delivered via tablet/smartphone technologies. This mode of delivery has been suggested to have strengths but to present technical and access-related challenges (Fernee and Scherpenzeel 2013), and was the one originally intended for this study. However, panel members felt this might be less successful with carers of older people, and raised concerns around familiarity with technologies and ease of use of interfaces which might make completion using this mode of delivery more time-

consuming and difficult to fit in around other activities. Possible alternatives were discussed, with feedback leading to the development of the time use diary in multiple modes of delivery; paper-based, downloadable spreadsheet, and online for internet-enabled devices including PC, tablet and smartphone.

The second carers' panel meeting focused on the content of the time use diary, with panel members asked to comment on the comprehension, completeness and ease of use of the latest draft. Carers discussed the relative importance of different activities and suggested alterations to wording to make it more context specific, e.g. from 'household cleaning' to 'additional household cleaning' to acknowledge that such activities would routinely have been done, but for some will have increased since taking on the 'carer role'. Carers noted that, given the 7-day window for data collection, important but less frequent activities might be missed. Consideration was given as to how to capture data on such activities. The panel understood the desire to collect robust data but emphasised the need for any data collection tool to avoid placing additional stress on carers' time, and changes were made to the final design of the time use diary to accommodate this.

Design

As suggested above, a number of design requirements for the time use data collection tool were identified in the course of the iterative and carer-informed development process. These were operationalised through a two-part time use diary, supplemented by pre- and post-completion interviews.

The pre-completion interview allows for explanation of the diary and how it is completed (although full details are also provided with the diary itself), collection of demographic data about the carer and the person that they support and about the context in which support is being given, and the administration of one of two questionnaires: either questions on activities of daily living ('ADLs/IADLs') taken from SHARE to collect data on the carer's abilities and the carer's perception of the abilities of the person that they support, or the short version of the Burden Scale for Family Caregivers ('BSFC') (Graessel et al. 2014). The questionnaire to be administered first is randomly selected, with the remaining questionnaire administered as part of the post-completion interview. This second interview also allows discussion of events during the data collection period and the carer's perception of the extent to which they regard it as 'typical', and a structured set of questions to evaluate and capture suggestions for improving the time use diary. Both interviews are offered on a face-to-face or telephone basis for participating carers within approximately 1 hours' travel of Stirling (i.e the 'central belt' of Scotland, which includes Glasgow, Edinburgh and Dundee and is home to approximately 80% of the Scottish population (Scottish Government 2010)). Participants located further away than this are offered telephone interviews or the opportunity to participate via links to online surveys.

The paper version of the diary is an A4 landscape orientation spiral-bound booklet with plastic covers and containing: a title page; project overview (1 page); activity frequencies section (3 pages); time use diary title page; instructions for completion, example and contact details (2 pages); 7 x daily diaries (4 pages each). The diary uses a san serif font and a minimum text size of 14 point throughout.

The first section of the diary provides a list of common care-related activities drawn from the earlier qualitative interviews with carers. Carers completing the diary are asked to indicate the frequency with which they would expect to do each of the activities, selecting from: 'not applicable', 'daily', 'weekly', 'monthly' and 'less than monthly'. Space is provided for carers to add other activities which they perceive as relevant to their role as carer and indicate the expected frequency of these.

Daily diary sections have a space to record the date, followed by a table in which the first column lists the common care-related activities from the previous section and subsequent columns ask the carer a series of questions about that activity on that day. Beneath the pre-populated cells in column one of the table there is space for carers to write in additional activities. Table 3 details the questions posed and possible response categories and summarises reasons for inclusion and format. The pages for each diary day end with a large text box for additional comments or for brief explanatory notes should the carer find that they are unable to complete the diary on that day.

Two versions of the time use diary have been produced. The second version has the care-related activities pre-populated in reverse order. Participating carers are randomly assigned versions of the diary. This provides a control for order effects and allows exploration of differences in reporting of 'multi-tasking' activities based on which activity is considered primary.

Table 3. Questions included in the 'day diary' sections of the time use diary

Question	Response categories	Reasons for inclusion and format
Did you plan for you/someone else to do this activity today?	Yes / No	This will allow us to understand the extent to which carers do or are able to anticipate tasks and plan their time use. It will capture data on activities which were planned but not executed, allowing examination of disruption to routines. Data is captured on which kinds of help or support are provided by people other than the participating carer.
Activity completed?	Yes / No / Partly	This will allow comparison between carers' planned and actual activities. It may shed light on what activities carers prioritise if routines are disrupted.

Question	Response categories	Reasons for inclusion and format
How many times a day did you do this activity?	(Number)	Data is captured on the frequency of activities. This provides additional data on activities which occur on a more-than-daily basis and allows comparison with stated frequencies in first section of diary. This format represents a compromise between systematic collection of data on all time use through the day and reducing the time and effort expended in completing a diary. The carers panel considered standard time use diary layouts to be likely to be too great a burden for most carers to complete: this format is designed to be more user-friendly and less labour intensive to complete compared to more traditional time use diary formats, but will provide less comprehensive data that would have been obtained with those formats. Understanding carers' routines and the 'rhythm' of a day might give insights into when additional help or support would be most required in times of crisis. Collecting time of first instance allows for partial reconstruction of a timeline for the day.
Time of day of first instance (approx.)	(Time)	
How long did the first instance of this activity take? (approx.)	(Duration given in hours / minutes)	
Additional activities at the same time? If so, please specify	Yes / No, plus text.	This question collects data on carer 'multi-tasking' whilst executing care-related activities. Knowledge of secondary activities will help to provide a more complete picture of providing care or support for an older person.

The electronic spreadsheet-based version of the time use diary follows the design of the paper version as far as possible, but with minor modifications. The project outline, activity frequency section, diary completion instructions and each of the seven day diaries are presented as separate worksheets accessed via tabs at the bottom of the screen. Pre- and post-completion interviews are also carried out as per participation using the paper diary.

An online version of the time use diary and associated data collection tools used in the study was developed using Bristol Online Surveys and takes the form of a series of survey questionnaires. The pre- and post-completion interviews are replaced by links to surveys which collect the same data as is collected in the interviews. Carers respond to an invitation to participate posted online by providing the research team with an email address. Surveys are then scheduled to be sent one per day to that email address, with data provided in each completed survey subsequently linked to the respondent via the email address. Whilst acknowledging that not all carers will have internet access, the availability of the online time use diary provides a route for participation of carers based anywhere in the UK rather than restricting participation

to those who happen to live close to the location of the research team. Unlike the interviews which accompany the paper and electronic spreadsheet versions, the questions to capture demographic data about the carer and the person that they support and about the context in which support is being given and the ADLs/IALs and BSFC questionnaires are all contained in the first survey for which carers are sent a link. Although this is more labour intensive for the carer at the start of the online data collection process it means that key data on the carer and the person they support have been collected and so collected time use data can still be included in analysis if carers drop out before completing all the remaining daily surveys.

Summary

This paper began by outlining changes in the context of unpaid care for older people. Trends identified included: population ageing, widening differences between life expectancy and healthy life expectancy, changing family compositions, increasing female labour market participation, changing attitudes to care and the rising human and economic costs of unpaid care provision.

Time use studies seem to offer a means of better understanding unpaid care, but challenges to data collection and decisions around reporting have meant that up until now that potential has been less than fully realised.

The paper then described the iterative, multi-stage process of developing a time use diary specifically for use with older people. Informed by findings from 62 UK-based carers of older people and with input from a specially convened carers panel, the time use diary has been designed to be user-friendly and less labour intensive than the 'gold standard' diaries based on fifteen-minute time periods. Paper based, electronic and online versions of the diary have been developed to help maximise participation in the study. Results of the study are expected to be available at the end of 2017.

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