Appendix C3

Guideline topic: Home care: delivering personal care and practical support to older people living in their own homes
Economic priority area: Care planning approaches
Review questions: in particular 2.1 parts 1 and 2, other review questions of relevance were 2.1.3, 2.3

Technical report produced by PSSRU (Personal Social Services Research Unit, London School of Economics) as part of the National Collaborating Centre for Social Care for the Guideline Development Group of this topic

Background

There is little evidence (of moderate to high quality) available on the cost-effectiveness of different care planning approaches applicable to the UK home care context. We carried out additional economic analysis of primary data collected as part of the Individual Budget pilot study (IBSEN). This multi-faceted study included a randomised controlled trial conducted to evaluate the national pilot of individual budgets in a sample of English local authorities. The study was funded by the Department of Health between 2005 and 2007. In this trial data were collected on a wide range of costs and outcomes for older people who were using home care and other social care services (see Appendix, appraisal of studies by Glendinning et al 2008, Jones et al 2012).

This report aims to provide the Guidline Development Group (GDG) with evidence to consider cost-effectiveness aspects of the following review questions:
2.1.1 What approaches to home care planning and delivery are effective in improving outcomes for people who use services?
2.1.2 What are the significant features of an effective model of home care?

To a lesser extent this report also provides information on aspects of the following review questions:
2.1.3 Are there any undesired/harmful effects from certain types of home care approaches?
2.3 What are the effects of approaches to promote safe care?

We used the IBSEN data (whilst not being constrained by the trial design) to explore the cost-effectiveness of different publicly funded care packages that are used by older people who live in their own homes. The analysis covered a wider spectrum of interventions than simply home care: it looked at social care services provided to older people living in their own homes including home care. This was considered a useful approach in the absence of cost-effectiveness data specifically on home care. We sought to identify the most cost-effective components of the care package and care planning approach for different groups of older people who use home care, in particular people with and without cognitive impairment (dementia). The perspective of the economic analysis was the NHS and local authorities in terms of health and social care costs.

Method

Data sources of information collected as part of the trial

Data were available for approximately N=400 older people; this group comprised individuals who had originally been randomized to the intervention group (i.e. those who were offered an individual budget – what would now be called a *personal* budget) as well as the individuals randomized to the comparison group. We combined the two groups for the purposes of new multivariate analyses but retained an indicator (dummy) variable to reflect trial assignment in case this had an influence on costs or outcomes[1]. Data were collected at two time-points: at baseline (i.e. around the time of identification for participation in the study) and then 6 months later. Data were collected from different sources and details of the data collection are summarised in Table 1. Baseline data (denoted t=0) were derived from local authority systems and included information about personal characteristics, needs and the level of publicly funded support. Information on service use, outcomes and needs were collected at 6 months (t=1) in interviews with the older people in the study (or their unpaid carers on behalf of older people if they did not have the capacity to participate in the interview). In addition, support plan records for older people who had an individual budget in place provided information about total funding of services and support service use over the 6 month period.

Table 1: Data collected, their descriptions, time and source of data collection

Information	**Description**	**Time (and source) of data collection***
Activities of daily living (ADLs)	Number of activities people were unable to do, including walking up stairs, walking down road, getting around indoors, getting in/out of bed, having a bath/shower, getting dressed	t=0 (LA), t=1 (SR)
Client group	Primary need classified by the local authority in these categories: physical or learning disability, dementia, mental illness, sensory impairment and vulnerability	t=0 (LA)
Living alone	People who had been recorded as not having the principal unpaid carer living in the same household	t=0 (LA)
Cognitive impairment	People with assessed (t=0) or self-reported (t=1) cognitive impairment including dementia	t=0 (LA); t=1 (SR)
Personal characteristics	Age, gender and ethnicity; ‘ethnicity’ referred to person being in the ‘White British’ group or in a different ethnic group	t=0 (LA)
Support package at baseline	Level of support that individuals received before start of the study as indicated by the costs of the support package	t=0 (LA)
Social care-related quality	Measured with the Adult Social Outcomes Toolkit (ASCOT)	t=1 (SR)

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[1] The precise number used in the analysis varies depending on the pattern of missing observations.

of life		
Psychological wellbeing	Measured with the General Health Questionnaire (GHQ)	t=1 (SR)
Use of health and social care services	Service use in the previous 6 months; collected from questionnaires with service users and support plan records of local authorities	t=1 (LA, SR)

*LA: From local authority system; SR=Self-reported through interviews

Outcomes for service users were measured using two standardised tools. The *Adult Social Care Outcomes Tool* (ASCOT; e.g. Forder et al. 2007) measures social care-related quality of life across seven domains: control over daily life; safety; personal care and comfort; home cleanliness and comfort; meals and nutrition; social participation and involvement; occupation. The *General Health Questionnaire* is a comprehensive measure of mental health-related wellbeing (GHQ-12; Goldberg and Williams 1988).

Costs referred to the total costs of the health and social care service utilization as reported by service users and - for people with individual (personal) budgets - as taken from support plan records held by local authorities. Unit cost data were those provided by councils or taken from the PSSRU compendium for health and social care for the relevant year (Curtis 2007).

Definition of the ‘intervention’ and variables used in the analysis

In this new analysis of the IBSEN data, the ‘intervention’ (based on the available data) referred to:
(1) Services that were provided as part of a planned social care package for older people living in their own home (most but not all services were provided in the person’s home), including

- home care,
- personal assistant services,
- equipment and adaptations,
- meals on wheels,
- lunch clubs,
- day care and
- telecare.

(2) The care planning approach that was employed: care management provided by a professional care manager or coordinator employed, for example, by the local authority or by home care agencies.

The variables used in this analysis and their descriptions are presented in Table 2.

Table 2: Variables used in analysis

Variable	**Description**
Outcomes (Q)	Outcomes, measured with ASCOT and GHQ
Cost (C)	Total costs of health and social care over the period of 6 month period prior to t=1
Care packages and care planning	Indicator variables for the ‘intervention’, as described above: home care, personal assistant services,

approaches (H)	equipment and adaptations, meals on wheels, lunch clubs, day care and telecare. Variables take value 1 if intervention received; and value 0 if not.
Individual budget, allocation (I)	Indicator variable taking value 1 for people who had been offered an individual budget; and value 0 for other individuals. (Note that not everyone who was allocated to this group actually *accepted* an IB, and among those who did, not everyone had received one by t=1.)
Direct payments (D)	Indicator variable taking value 1 if the person used direct payments; and value 0 if not. Choosing a direct payment was possible in both the individual budget and comparison arms of the trial
Health care services (S)	Health services used by the older person over the 6 month period prior to t=1
Needs (N)	Needs-related variables assessed by the local authority or established in interview: • ADLs • Client group • Cognitive impairment • Living alone
Personal characteristics (Z)	• Age • Gender • Ethnicity
Support plan (P)	Whether or not a support plan was in place at t=1; this referred only to people in the individual budget group; not everyone in this group had a support plan in place at t=1. There was no single variable to measure this factor, and so instead we took a combination of variables which indicated whether the person was purchasing support as part of the individual budget; we also considered inter-correlation with variable I.

Statistical analysis

Statistical analysis using STATA version12 was carried out to examine how different services or components of a care package and the care planning approach (the ‘intervention’) affected outcomes and costs after controlling for other variables that could potentially have influenced costs and outcomes. These covariates included: needs, personal characteristics, the use of other services, and the effect that the randomization might have had (this was necessary as the trial was not blinded). Outcomes and costs were taken as the dependent variables, and we hypothesized that these might be determined by a range of independent variables, including the ‘intervention’ i.e. the care package and care planning approach. The design of this analysis can be expressed algorithmically as follows – with q and c being the estimated regression coefficients:

$$Q = q_0 + q_H H + q_I I + q_D D + q_S S + q_N N + q_Z Z + q_P P$$

$$C = c_0 + c_H H + c_I I + c_D D + c_S S + c_N N + c_Z Z + c_P P$$

Statistical models were run for cost (measured over the 6-month period) and for nine outcome measures at the 6-month point (GHQ, ASCOT score and each of the seven ASCOT domains individually). Costs were modelled with a generalized linear model, while outcomes were modelled using linear regression; the reason for using different types of analysis was that the costs variable was highly skewed whereas the distributions of the outcome variables (and model residuals) were close enough to normal to allow standard linear regression. The modelling used multiple imputed data to limit the number of observations lost due to missing values. Iteratively, variables were excluded that did not appear to have any significant correlation with costs or outcomes. Additional analysis was conducted to explore some of the interactions between variables that were expected to impact on costs and outcomes. Based on the model with the best fit, we estimated an incremental cost effectiveness ratio (ICER). This was done by first estimating the marginal effect on cost of receiving home care and then the marginal effect on outcomes of receiving home care.

Findings

Variables that did not have a significant impact on costs or outcomes were iteratively excluded from the respective regression. This section only presents findings on variables that *did* impact on costs or outcomes independently i.e. after controlling for other variables such as needs or personal characteristics. Costs refer to the total costs of health and social care whilst outcomes refer to the GHQ and ASCOT.

Costs: Total costs for health and social care

Cost data were available for N=402 older people. None of the independent variables had a significant influence on costs when significance was defined as a p-value of 0.05 or smaller. If the significance level was relaxed, which could be argued to be appropriate given the modest sample size and exploratory nature of the analysis, some variables were found to be influential. In particular, age (p=0.055) was found to have an inverse relationship with costs, possibly indicating that the costs of care packages decreased with age; this is consistent with findings from the original study which showed that older people tended to receive fewer services compared to other client groups indicating that this group might be underserved (Jones et al 2012). Having personal assistant services was linked to higher total costs (p=0.076) and so was having a support plan in place at 6 months (p=0.073); the latter finding was likely to be at least partially explained by the additional costs of care management. This was found in the original study for the group of people who were allocated to the individual budget group (i.e. the group that was more likely to have a support plan). When we looked at the interaction between receipt of home care and whether the person lived alone, total costs were found to be significantly higher for those who lived with their spouse or carer and who used home care.

This could indicate that spouses or carers were acting as advocates for service users and negotiated greater access to services.

Outcomes: Mental wellbeing measured by the General Health Questionnaire (GHQ)

Data for this mental or psychological wellbeing outcome measure were available for N=381 older people at t=1. In regards to *interventions*, the following associations were found, in each case after controlling for other factors including personal characteristics and needs:

- Using home care was associated with significantly higher scores on the psychological wellbeing scale (p=0.021), implying that people using home care had higher psychological wellbeing than those with otherwise similar characteristics and needs who did not use home care.
- The variable ‘equipment or adaptations’ was linked to significantly lower psychological wellbeing (p=0.025) controlling for other variables including needs (measured through ADLs), which implied that people who used equipment and adaptations tended to report lower psychological wellbeing than people with otherwise similar characteristics and needs.

In regards to *personal characteris*tics, the following relationships were identified:

- People with learning disabilities reported significantly higher psychological wellbeing (p<0.001). It was unlikely that this was due to reporting on behalf of service users by carers or family members because only 7% of responses for people with learning disabilities were proxy responses on their behalf.

No other variables were significantly linked to psychological wellbeing when p of 0.05 was used as the cut-off. However, a few variables reached significance with a less stringent p-value (between 0.05 and 0.1). People with assessed cognitive impairment at baseline were more likely to report worse psychological wellbeing (p=0.067). A higher number of ADLs as reported by older people at follow-up appeared to be linked to lower psychological wellbeing scores (p=0.091); ADLs assessed by the local authority at baseline did not impact on this outcomes so the relationship between ADLs and psychological wellbeing could not be confirmed.

Outcomes: Social care-related quality of life measured by the Adult Social Care Outcomes Tool (ASCOT)

Data on the overall ASCOT score (covering all domains of social care-related quality of life) were available for N=383 older people. People with cognitive impairment at follow-up were significantly more likely to report worse overall social care-related quality of life (p=0.027) than people who were otherwise similar; no other variables had a significant influence on the overall ASCOT score based on p-value of less than 0.05. When looking at relationships with higher p-values of between 0.05 to 0.1, older people using home care had significantly higher unmet needs in terms of overall social care-related quality of life than older people with otherwise similar characteristics and needs (p=0.056). Older people using equipment and adaptations had significantly lower scores on the overall ASCOT, indicating higher unmet needs (p=0.094).

For individual domains of the ASCOT scale the following associations were identified in regards to *interventions*, in each case after controlling for other factors:

- Older people using home care were more likely to feel in ‘control over (their) daily lives’ (p=0.01), and less likely to feel their ‘accommodation cleanliness and comfort’ needs were met (p=0.013); people using home care were also more likely to report higher unmet needs in terms of ‘social participation and involvement’ (p=0.081) but this was only significant when using a higher p-value between 0.05 and 0.1;
- Older people using personal assistant services were significantly more likely to report higher unmet ‘meals and nutrition’ needs (p=0.014);
- Older people moving from having home care to personal assistant services were significantly more likely to report that they felt less safe (p=0.018); this referred to a quite small group of people so that findings need to be interpreted with caution;
- Older people who used equipment and adaptations were significantly more likely to report that they felt less safe (p=0.026); older people who used home care as well as equipment and adaptations were more likely to report unmet ‘meals and nutrition’ (p=0.004); this could be, for example, because the home care time was spent prioritising needs related to the equipment/ adaptations or because people using equipment or adaptations had additional needs in this domain;
- Older people who used direct payments reported significantly higher unmet ‘accommodation cleanliness and comfort’ needs (p=0.01);

In regards to *personal characteristics*, the following links were found after controlling for other factors:

- Older people living alone reported significantly more unmet needs in the domains ‘personal care/comfort’ (p=0.005) and social participation and involvement (p=0.032);
- Older people assessed by the council with cognitive impairment at t=0 were significantly more likely to report that they felt less in control over daily life (p<0.001); older people who at follow-up were reported to have cognitive impairment were significantly more likely to report higher unmet needs in terms of occupational activities (p=0.006).

Inferred effect of home care on costs and outcomes

The marginal cost of receiving home care was estimated as £95. That is, total health and social care costs were £95 greater for those using home care compared with those who did not use home care, after controlling for other factors. This cost relates to the 6-month period over which costs (and outcomes) were measured, and are valued at 2007/08 prices. The value in 2012/13 prices would be £107[2].

Receipt of home care was associated with a 2.1 point difference in score on the GHQ scale i.e. people using home care had on average a 2.1 point higher score than people who did not use home care controlling for all other factors, which reflects a 6% difference on the overall scale. The estimated incremental cost effectiveness ratio (ICER) for GHQ (i.e. cost per unit difference in GHQ score) was 45, which means that it was costing £45 (equivalent to £51 in 2012/13 prices) to achieve an additional one-point difference in psychological wellbeing. We did not calculate the ICER for home care on the overall ASCOT score as these findings were less robust.

Discussion

Some of the findings of the analysis are not easy to interpret in the context of a cost-effective care package and care management approach, partly because of how data had been collected (e.g. outcomes assessed only at one point in time; cost and needs data collected from a variety of different sources), but also because of the nature of the service and the population using it. Findings on the influence of home care arrangements and outcomes need to be interpreted in the context of a service that – at least when publicly funded – is often focused on meeting the most pressing and substantial needs of a group of people who might generally have relatively low capacity to benefit and where the primary aim of social care (and particularly home care) under budget constraints might arguably be to prevent the exacerbation of ill-health rather than meeting a comprehensive set of social care needs.

Despite these restrictions, some initial conclusions might be drawn about cost-effectiveness of care packages and arrangements used by older people living in their own homes.

- Among the different components that were part of a wider home care package (such as personal assistant services, telecare, care management and meals on wheels) the home care variable appeared to have a significant impact on costs and outcomes for older people (controlling for all other factors). **Older people using home care were more likely to have higher psychological wellbeing scores at a cost per unit increase (measured on the GHQ scale) of £51 in 2012/13 prices**.
- In terms of social care-related quality of life (measured via the ASCOT), findings were more difficult to interpret as older people using home care seemed to have lower unmet needs in some domains and higher unmet needs in other domains when compared to older people not using home care (controlling for all other factors). **It was thus not possible to construct a robust ICER on the ASCOT**.

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[2] Calculation was based on the Hospital and community health services (HCHS) Pay and prices index

- In addition, our findings suggest that certain **sub-groups of older people – in particular those with cognitive impairment and those living alone – were more likely to report worse psychological wellbeing and/or higher unmet needs** in regards to the social care package they used in their homes (including home care) than people with otherwise similar characteristics and needs.

References

Curtis L (2007), *Unit Costs of Health and Social care 2007*, Personal Social Services Research Unit, Kent.

Forder J, Netten A, Caiels J, Smith J, Malley J (2007), Measuring Outcomes in Social Care: Conceptual Development and Empirical Design. Quality Measurement Framework Project. PSSRU interim report, PSSRU Discussion Paper 2422, University of Kent.

Glendinning C, Challis D, Fernandez J, Jacobs S, Jones K, Knapp M, Manthorpe J, Moran N, Netten A, Stevens M and Wilberforce M (2008), Evaluation of the Individual Budgets Pilot Programme: Final Report, Social Policy Research Unit, University of York, York.

Goldberg DP and Williams P (1988), A User's Guide to the General Health Questionnaire. Windsor: NFER-Nelson.

Jones K, Netten A, Fernández JL, Knapp M, Challis D, Glendinning C, Jacobs S, Manthorpe J, Moran N, Stevens M, Wilberforce M (2012), The impact of individual budgets on the targeting of support: findings from a national evaluation of pilot projects in England, Public Money & Management, 32:6, 2012.

StatCorp. Stata Statistical Software: Release 12.1. StataCorp 2012.