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**INTELLECTUAL DISABILITY, CHALLENGING BEHAVIOUR AND COST IN
CARE ACCOMMODATION: WHAT ARE THE LINKS?**

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ABSTRACT

The paper examines the links between degree of intellectual disability, challenging behaviour, service utilisation and cost for a group of people with intellectual disabilities living in care accommodation in England. A cross-sectional survey was conducted of people with intellectual disabilities, identified via provider organisations, with supplementary collection of costs data. Multivariate analyses of cost variations were carried out for 930 adults with intellectual disabilities. There were strong, non-linear, interdependent links between degree of intellectual disability, behaviour, service use and costs. Higher costs were associated with more severe intellectual disabilities and more challenging behaviour. Sector and scale of residence also influenced cost in quite complex ways. Access to and use of services by people with intellectual disabilities were not always appropriately linked to perceived or actual needs. Policy makers and local commissioning agencies need to explore the sources of cost variation between individuals, sectors and types of accommodation in order to achieve national policy objectives on quality, choice, independence and inclusion.

KEY WORDS

Intellectual disability, challenging behaviour, service use, costs

INTRODUCTION

The White Paper *Valuing People: a New Strategy for Learning Disability in the 21st Century* identifies people with intellectual disabilities as ‘amongst the most vulnerable and socially excluded in our society’, and sets out four key principles – rights, independence, choice and inclusion – for improving their quality of life chances (Secretary of State for Health 2001).

The Government’s national objectives for people with intellectual disabilities are built around a person-centred approach that enables them ‘to have as much choice and control as possible over their lives and the services and support they receive’ (p 4). The cost implications and broader affordability of a person-centred approach have been questioned (Mansell and Beadle-Brown 2004).

As no two users of a given service or programme will have exactly the same characteristics or needs, or hold the exact same preferences – and because they will also differ in their personal and family circumstances – it follows from a person-centred approach that service responses should rarely be identical. Such an approach starts with the individual and not with services, and the White Paper argues that all options should be considered when the future needs of people with intellectual disabilities and their families are being explored. Local authorities also have the duty of Best Value: they must deliver services by the most economic, efficient and effective means available, publish annual Best Value Performance Plans and review all of their services every five years.

In reality, however, service use patterns tend to show rather less variability than individual needs or preferences. This is partly because services are constrained by historical availability, funding practices, professional norms and provider habits; partly perhaps because of a simple but pervasive societal preference for some degree of consistency or procedural equity in service access, and partly because the information on user needs available to commissioners (purchasers) has been less than perfect. One of the unlamented features of care environments in some of the UK’s former ‘mental handicap’ hospitals was the often very marked degree of uniformity and rigidity that ignored differences between individuals. This is one of the defining features of an ‘institutional’ environment. But now that services for almost everyone with an intellectual disability in the UK are delivered in non-hospital settings, albeit not always ‘non-institutional’, we must ask whether service systems are responding more flexibly to individual needs and preferences.

The aim of this paper is to address this question. In particular, we seek (a) to describe the patterns of service use and costs for people with intellectual disabilities in care accommodation in some areas of England; (b) to explore the correlates of those patterns; and (c) to examine the degree to which cost variations are linked to the characteristics of users (notably degree of intellectual disability and behavioural problems) in the context of other factors.

METHODS

Sampling and data collection

Data were collected as part of a study designed to develop ‘resource groups’ and ‘benefit groups’ for people with intellectual disabilities (Pendaries 1997a, Comas-Herrera *et al.* 2001). There were three phases of data collection, covering: (i) characteristics of sample members, (ii) their use of services and (iii) the unit costs of services.

The first phase, in 1996, assessed the characteristics of a sample of over 2000 people with intellectual disabilities aged 18 or over on two dimensions, intellectual disability and challenging behaviour, using a revised version of the Learning Disability Casemix Scale (LDCS; Pendaries 1997b). Sample members were living in residential accommodation supported by 11 NHS Trusts, four voluntary providers (including housing associations) and three large and several small private providers spread across England. Each organisation that agreed to take part in the study was sent LDCS assessment forms (see below), together with written instructions on how to administer them. In total, information was collected for 2093 people in this first phase. This was a pragmatically gathered sample and the areas and providers together do not generate a nationally representative sample of people with intellectual disabilities.

In the second phase, service use data were gathered for a sub-set of clients using a tailored version of the Client Service Receipt Inventory (CSRI; Beecham & Knapp 1992). The CSRI was sent to the 14 providers willing to continue in the research. Together they supported 1300 people with intellectual disabilities. Questionnaires were returned for 1128 service users, or

87% of those participating in this phase. Eight questionnaires were unusable due to missing information.

In the third phase, a newly developed costing pro-forma (see below) was sent out to gather revenue and capital costs information. Although some organisations were unable to provide the cost information required, the response rate was generally good: data were provided for 930 people (83% of the 1128 people for whom CSRI information had been returned).

Housing associations and private sector providers were less likely than others to provide financial information. (The housing associations had not been directly involved in previous phases of the project and possibly had fewer incentives to return costs data. One of the private providers did not have the necessary financial information readily available.)

Research instruments

Learning Disability Casemix Scale (LDCS)

The instrument used to assess the 2093 participants in the first phase was a revised version of the LDCS (Pendaries 1997b). It has two main dimensions: intellectual disability and challenging behaviour. In the revision, two items were added to the ability/disability sub-scale, bringing the total number of variables for the ability/disability sub-scale to 14. Two further variables were also added to the behaviour sub-scale, bringing the total number of behaviour variables to nine. The items added to the ability/disability subscale ('Self Initiated Activity' and 'Ability to Sustain Attention') were intended to account for limitations of the learning process, an aspect not covered in the original scale. The two items added to the challenging behaviour sub-scale ('Dealing with Frustration' and 'Excess or Deficit of Social Interaction') were intended to capture relatively common forms of behaviour that often result in increased staff input. These changes improved the validity of the scale (Comas-Herrera *et al.* 2001). In both sub-scales, higher scores indicate higher levels of severity.

The validity of the LDCS has been tested in relation to the Adaptive Behaviour Schedule (Nihira *et al.* 1993), a well-established research instrument, and been found to measure similar things. The LDCS has also been found to have good inter-observer reliability and good test-retest reliability (Pendaries 1997b).

Client Service Receipt Inventory (CSRI)

To collect information on individual service utilisation patterns, a version of the Client Service Receipt Inventory (CSRI) was prepared. The CSRI was reduced so that it covered only two sides of A4 paper and concentrated on accommodation arrangements as well as the use of services provided and funded separately from the accommodation budget. A retrospective period of three months was selected, although use of services which have high cost implications, such as hospital care, was recorded for a period of 12 months. Note that these services are those not included in the residential accommodation budget.

Costing pro-forma

A separate questionnaire was used to gather information to complement the financial information available from the income and expenditure accounts (for the financial year 1996/97) for each facility in which service users lived. The pro-forma covered the valuation of the buildings in which care was provided (such as the council tax band), whether the home paid overheads and whether services were provided to non-residents. In the main, the finance department of each participating organisation provided these data.

Costing methodology

The estimation of costs followed established methodologies and principles of economic evaluation in this field (e.g. Beecham 1995). After collecting service utilisation data using the CSRI we estimated the long-run marginal opportunity cost for each service in a unit of time (per day or per hour) that reflects the way people use it. Each unit cost was then adjusted to reflect the intensity (duration and frequency) of service use to allow calculation of the full cost of each care package.

In estimating the long-run marginal opportunity costs of accommodation facilities the revenue costs included the full staffing costs (care staff and others), adjusted for the hours staff spent providing support to non-residents. Non-staffing costs included items such as heat, light, routine maintenance and household equipment. Overhead costs borne by the managing

agency were calculated using the organisation's own accounts where possible, or by adding 5% of other revenue costs (Audit Commission 1993). Three techniques were used to estimate the level of resources invested in the buildings and equipment (capital costs): a figure based on a recent market valuation of the site discounted at 6% over sixty years; a valuation based on the property's council tax banding and discounted at 6% over 60 years; or, where considered to be more accurate than the council tax band, rent payments made by the individual organisations and their own arrangements for depreciation of capital. When the organisation could not provide a realistic replacement cost for fixtures and fittings, 10% of the annual building costs was added (as, for example, in the method used by Emerson *et al.* 1999).

For hospital and community-based services not provided by the organisation responsible for accommodation and associated care, unit cost estimates were taken from the widely used annual compilation by the Personal Social Services Research Unit (Netten *et al.* 1998).

Where costs for specific professionals were not available from this source, unit costs calculated by colleagues and employed in current or recent evaluations of services for people with intellectual disabilities or challenging behaviour were used (Emerson *et al.* 2001). Some sample members attended work-orientated day activity services. The provision of work for people with intellectual disabilities represents both a cost and a benefit to the employer: the benefit of the goods produced and the cost of the supervising staff. Following the approach adopted by Emerson *et al.* (2001), we assumed that employers cover their costs and so a zero cost has been recorded for work-related activities.

All costs are expressed in pounds sterling at 1996/7 price levels, as this was the period in which the service use and other data were collected. To inflate to current prices would in principle need a separate inflator for each service, although in fact all services have seen low and quite similar cost inflation since 1997 (Netten & Curtis 2003). Multiplying all costs reported in this paper by 1.29 would take them (approximately) to 2002/03 price levels.

Statistical methods

We hypothesised that service use patterns would vary between individuals and would be related in part to inter-individual differences in the severity of intellectual disability and

challenging behaviour. We first examined patterns of service use using logistic regression to estimate the probability of receipt for each service, given the characteristics of the clients and their care settings. We then summed the services used by individuals, weighted by their unit costs, to obtain an aggregate cost measure for each person. Using ordinary least squares (OLS) multiple regression, we examined a number of possible sources of cost variation. However, a common finding in economic evaluations in health and social care contexts is that costs do not follow a normal distribution, but rather have a long skew to the right. If this non-normality in cost carries through to leave regression residuals also non-normally distributed, OLS estimates may not be appropriate. We therefore also employed bootstrap methods using bias-corrected methods and 2000 replications to calculate an alternative set of standard errors (Thompson & Barber 2000).

RESULTS

Sample characteristics

We obtained data about the characteristics and service receipt of 1120 people, and data on the costs of the services for 930 of them. As Table 1 shows, there were few differences between the full sample and the costed sub-sample. The 1120 people were living in 158 different residential settings. Mean scale of facility was 13 residents, but in fact there were ‘clusters’ of scale: 129 sample members were in settings clustered around a scale of 44 residents, and 988 sample members were in settings clustered around a scale of nine residents.

[TABLE 1 ABOUT HERE]

We found substantial differences in the severity of intellectual disability and challenging behaviour of service users according to whether they lived in NHS or private/voluntary facilities. NHS trusts tended to specialise in providing services for people with more profound levels of severity (Table 2). (For a more detailed description of the data, see Comas-Herrera *et al.* 2001.)

[TABLE 2 ABOUT HERE]

In the final stage of the project there were 14 organisations: seven NHS trusts (66% of people in the sample), six private for-profit providers (25% of the sample), and one voluntary or non-profit provider (9% of the sample). These percentages can be compared with the distribution of places in staffed residential homes in England in 1996-97: 9% in the NHS, 39% in the private sector, 34% in the voluntary sector, and 18% in local authority homes (Kavanagh & Opit 1998). Our sample therefore over-represented the NHS sector and under-represented the other sectors, and so it would be inadvisable to generalise from the results that follow. Nevertheless, this quite large sample provided us with an unusual opportunity to explore the sources of inter-individual service use and cost variation within some sectors of provision.

For purposes of this analysis, the single voluntary sector provider in the sample was grouped with the private sector providers to ensure that our results were not too biased by the characteristics particular to this one provider. Two sectoral groups were therefore examined – NHS trusts and independent sector (private and voluntary) providers – in our subsequent analyses of service use and cost variations. Voluntary and private sector providers are likely to differ in certain respects although not as simply or as stereotypically as might be thought, as recent work on care homes and domiciliary care services for older people makes plain (Kendall 2001, Kendall *et al.* 2003).

Service use and cost

Table 3 shows the percentage of people using some of the services asked about in the study and the average costs for each user. (The services not listed in the table were used by less than 5% of the sample.) Each average weekly cost reflects both the intensity with which a service is used and its unit cost. Specialist hospitals for people with intellectual disabilities (the former ‘mental handicap hospitals’) are not listed because so few people had used them (1.2% of sample). Hospital-based day activity appears to make the largest contribution to total cost, reflecting both a tendency to intensive use as well as a higher unit cost than the other types of day services. Day centres and social clubs were the more widely used day services. The largest cost component was accommodation (an average of 85% of the total), which includes living expenses and staff employed on site.

[TABLE 3 ABOUT HERE]

Average total weekly cost for sample members was £692, which includes averages of £588 for accommodation (and the associated staffing), £7 for acute health care costs, £75 for day care and £22 for professional (or community) services. Average costs tended to be higher in NHS than in other settings (Table 4). People living in NHS settings (long-stay hospital costs, hostels and NHS-provided residential care in ordinary housing) were rated as scoring more highly on both the intellectual disability and challenging behaviour indicators, which may partly explain the higher costs (examined below).

[TABLE 4 ABOUT HERE]

On the basis of previous research findings in the UK (discussed later), a number of factors might be hypothesised to account for (at least some of) the observed differences in service utilisation and costs, including the characteristics (degrees of intellectual disability and challenging behaviour) of individual service users. We did not have the data to control for all possible hypothesised cost-influencing factors.

Service use patterns

There were marked individual variations in service use patterns. This is already obvious from Table 3: for example, 7% of sample members used hospital accident and emergency services in the previous three months and 93% did not, while only half the sample had seen a GP.

For each of the services used by a substantial number of sample members we employed logistic regression methods to test for associations between service use, degree of intellectual disability and challenging behaviour, controlling for age, the (average) number of residents in the accommodation facility and whether the provider was an NHS Trust or an independent sector provider. Table 5 shows, for each service, whether these factors increased or decreased the probability of using it.

[TABLE 5 ABOUT HERE]

The degree of intellectual disability clearly influenced the use of the services listed in Table 5, while the extent of challenging behaviour influenced use of day centres/social clubs, psychologists, psychiatrists and dieticians. Some services, such as non-hospital-based day activities, tended to be used by people with more moderate intellectual disabilities, whereas people with higher disability scores were more likely to use hospital-based day activities. Individuals with more severe intellectual disabilities were more likely to use services such as speech therapy or physiotherapy. As would be expected, higher challenging behaviour scores increased the probability of seeing a psychologist or a psychiatrist.

Other characteristics also affected the probability of receiving services. For example, older people were less likely to be offered services such as places at work-oriented centres, or seeing a psychologist or a speech therapist, but more likely to see a GP.

The average number of residents and the sector to which a home belonged both affected the probability of receiving some services. For example, people in smaller homes were more likely to receive some types of day care than others: they were less likely to go to work centres, education centres or drop-in centres, but on the other hand were more likely to go to day centres. Being in a private/voluntary home also affected the probabilities of receiving services provided outside the home. For example, people living in private/voluntary homes were less likely than people in NHS facilities to use hospital-based day activities, but more likely to go to education centres or drop-in centres, or receive other types of day care. They were also more likely to see a GP, but less likely to see an occupational therapist or dietician. Some of these variations could be due to differences in the ability of staff in the residential facility to provide services themselves. It may be that staff in private and voluntary homes are more likely to favour flexible day activity packages, or that staff in NHS hospital wards can access basic health care and therapists through other hospital staff. The average staff cost per resident in the NHS facilities was much higher than for the private/voluntary homes, which might reflect higher staff/resident ratios or more qualified and/or more highly paid staff in the NHS sector. Another factor could be that in NHS accommodation there is greater ease of access to other services provided within the same Trust than would be the case in other provider sectors.

Overall, we found evidence that whether or not an individual uses a service was linked to a certain extent to their needs-related characteristics; we also found that the size and sector of accommodation were influential. We do not report here the results of analyses examining differences in the *quantities* of services used but instead turn directly to the aggregated version of these quantities, weighted by their unit costs to measure each individual's total weekly cost of support.

Cost variations

There were marked total cost differences across the sample, ranging from £220 for one person's weekly care to as much as £1570 for another. We have just noted that the severity of intellectual disability and challenging behaviour, a person's age, the size of the home and the provider sector all influenced the patterns of use of some services. How did they influence services in aggregate, as measured by total cost?

The results of the multiple regression equations, using ordinary least squares followed by bootstrap methods, are summarised in Table 6. The sample size fell to 919 people, because of missing observations on some variables. The included variables in the regression equation explain a third of the observed cost variation. In other words, the services used by individuals were responding in part to the individual characteristics and features of the care settings measured in this study. Nevertheless, two-thirds of the observed cost variation cannot be explained (statistically) by the cross-sectional analysis, an issue to which we return shortly.

Costs were higher for those people with more severe intellectual disabilities and those who displayed greater levels of challenging behaviour. The cost links are non-linear and interdependent: at more moderate levels of intellectual disability there is a simple positive linear relationship between costs and behaviours; at higher disability levels (where there were in fact relatively few sample members) there is a slight curvilinear cost-behaviour relationship, although costs are still generally higher for people with more challenging behaviour. The impact of the comparative severity of intellectual disability on cost is mediated through both the sector of accommodation (there being a lower gradient relationship in the NHS sector than in the private/voluntary sectors) and through the size of accommodation setting (the impact of the degree of disability on cost being slightly less in

larger facilities). These significant associations suggest that larger facilities - and these two features are correlated - have greater potential to spread the responsibility for supporting challenging behaviours and intellectual disability, respectively, across the staff complement.

[TABLE 6 ABOUT HERE]

There are also direct effects of sector and size of facility on cost, in addition to those linked to disability levels. Generally, other things being equal, NHS facilities were more expensive than private/voluntary facilities. However, as just noted, the cost difference between the sectors is not straightforward, but linked to facility size and to the characteristics of individual residents. We should therefore be cautious about drawing conclusions about inter-sectoral differences from a sample that draws data from a relatively small number of independent sector providers.

Finally, the scale of facility, in this case measured by the number of residents in the home during the year, exerted an influence. There was an interesting difference between the sectors. NHS facilities clearly enjoyed economies of scale, with cost being just under £2 lower per resident week for each additional resident in the facility. In part this was because the NHS sample included some people living in quite large hospital facilities. On the other hand, the voluntary/private facilities appeared to be facing diseconomies of scale, with each additional resident in the home generating an additional cost of £2.48 per resident week across *all* residents.

DISCUSSION

We found that access to and utilisation of services by people with long-term needs is clearly not a random process. Equally, however, access and utilisation are not appropriately linked to individual needs. In this paper we sought to explore the connections between the needs of individual people with intellectual disabilities (as measured along just the two dimensions of intellectual disability and challenging behaviour, although these are certainly two key dimensions for this group of people), their use of individual services and the aggregate cost of service use. Interesting patterns emerged from the analyses.

Before discussing those patterns we should note the main limitations of the study. The sample of people with intellectual disabilities was drawn non-randomly, mainly from NHS facilities, making it difficult to generalise the findings nationally. Second, we only had an aggregated cost for the residential accommodation settings. In this respect, our study is the same as almost every other UK study in the intellectual disability and social care fields. (The ward costing by Wright & Haycox 1984 is among the rare exceptions.) It does not cause problems when looking at total cost. However, it does mean that the analyses of service utilisation patterns (summarised in Tables 3 and 5, for example) relate only to services not already provided within the accommodation budget. Third, we had no outcome information and so we cannot comment on, for example, the cost-effectiveness of different accommodation settings.

Fourth, the statistical analyses were able to ‘explain’ only a third of the observed variance in costs. Reasons for this seemingly low percentage might include the lack of data on other characteristics of residents and the reality of poor responses by services to individual differences in intellectual disability and behaviour. Services may be responding poorly for a number of reasons, including lack of information on individual needs, managerial capacity, skilled staff shortages, inflexible working patterns, or financial pressures (Cope 2003, Department of Health 2004, Learning Disability Task Force 2004). In other words, the unexplained variance is probably part methodological and part situational, although we cannot separate or quantify the two. In fact, many other cost studies in the intellectual disability field have attained very similar proportions of variance explained (see below).

Challenging behaviour is socially constructed: influenced both by individual factors and the environment in which people live. The Mansell Report (1993) provides an excellent discussion of the issues. It did not support large-group models of accommodation and quoted evidence of consistently poor quality of life in hospitals. Mansell concluded that the ability to provide services for people with challenging behaviour in small local settings would be an indicator of service quality for people with intellectual disabilities in general. The cross-sectional study described here could not examine the dynamic effects of the nature of service provision on challenging behaviour, so that residence scale (for example) and degree of challenging behaviour have had to be treated as independent variables in the analysis.

Patterns and predictions

Our analyses of this quite large data set revealed some complex associations between costs, resident characteristics and type of accommodation. The receipt of services outside residential care settings reflected in quite large measure the degrees of intellectual disability and behavioural characteristics of individual residents, but there was also a sector effect. Service users living in NHS settings were *more* likely than private/voluntary sector residents to use NHS day hospital services (although this relationship was likely to be heavily influenced by those residents of NHS hospitals) and more likely to see a dietician or occupational therapist, but *less* likely to go to an education centre, drop-in centre or other social club, and also less likely to see a GP (again the influence of hospital residence is pertinent here). These sectoral patterns mirror some previous findings for residential care for older people (Kavanagh & Knapp 1997) and for people with long-term needs associated with mental health problems (Hallam *et al.* 1995). Such patterns might reflect unmeasured needs, and/or the preferences of residential setting staff when seeking outside help, and/or differential access to scarce services. More generally, our results support previous evidence on the poor access to mainstream health care faced by many people with learning disabilities (Cooper 1997, Morgan *et al.* 2000, Secretary of State for Health 2001, Cope 2003).

The regression analysis showed that costs were significantly linked to the intellectual disability and behavioural characteristics, as well as to scale of residence and sector. Previous studies have reported associations between costs and the needs-related characteristics of individuals with intellectual disabilities. Studies of people who had left long-stay hospital settings for (intended) permanent care in the community have found links between costs and service user needs, particularly skills and behavioural characteristics, and some evidence of economies of scale within accommodation facilities (Knapp *et al.* 1992, Cambridge *et al.* 1994, Beecham *et al.* 1997). The latter study found that public sector community accommodation was more costly than private or voluntary sector accommodation, and indeed more expensive than hospital, after adjusting for differences in resident characteristics. In a different research design, looking cross-sectionally at three major types of facility – village communities, NHS campus facilities and dispersed housing – Hallam *et al.* (2002) found that individual resident characteristics (including age, intellectual disability and challenging behaviour), service model (including group living arrangements and staff qualifications) and

service processes (including social climate) all significantly influenced costs. Overall, and in line with most other studies and with the findings presented here, roughly one third of the observed variation in weekly cost could be explained by these factors. A small sample study in Wales looked at the accommodation costs of people with intellectual disabilities and the most severe challenging behaviour (Felce *et al.* 2000). It found that accommodation cost was higher for residents with lower ability. There was also a scale effect: costs were lower in larger facilities.

At a different level of analysis - looking at residential facilities rather than residents - Shiell *et al.* (1993) explored cost variations for a random stratified sample of staffed community facilities in England in the late 1980s. Smaller facilities were apparently no more expensive than larger ones and the independent sector appeared to be providing a good quality service at no additional cost. The authors urged caution in interpreting their findings, since the relationship between agency type and cost was complicated by interactions between agency, service quality and resident dependency. Public sector facilities accommodated people with higher levels of need than private and voluntary sector facilities. This same pattern was evident from the study reported in this paper.

Our new analyses confirm that patterns of service use are almost always varied, and that cost differences are inherent in all care systems. Such variations are clearly very relevant to policy-makers and local commissioners as they seek to provide good quality services that meet the Government's objectives of promoting independence, choice and inclusion. The question we were able to address in this study was whether the observed service use and cost variations for people in care accommodation reflected the different needs of individual residents (as measured by the severity of intellectual disability and behavioural problems), while also taking into account the possible effects of accommodation scale and sector. Our finding that such associations were quite strong has relevance for local commissioning strategies and, in the context of the Best Value principles, suggests a need for dependency-contingent reimbursements in the contracts drawn up with providers (cf. Comas-Herrera *et al.* 2001). The White Paper stresses that services for people with intellectual disabilities and challenging behaviour should be commissioned on an individualised basis and should seek to promote inclusive lifestyles (Secretary of State for Health 2001 paragraph 8.43). Partnerships working and person-centred planning are seen as key to the achievement of social inclusion.

Our findings therefore also have relevance in the context of this national policy commitment to person-centred planning.

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Table 1: Service user characteristics

		Mean	Median	Standard deviation	Range
Age	Full sample	44.4	43	13.0	18-93
	Costed sample	44.4	42	12.8	20-92
Intellectual disability ¹	Full sample	21.5	22	11.0	0-42
	Costed sample	21.9	23	11.1	0-42
Challenging behaviour ¹	Full sample	7.8	7	5.7	0-30
	Costed sample	7.5	7	5.5	0-30

¹Measured using LCDS.

Table 2: Intellectual disability and challenging behaviour mean scores by sector

	NHS	Private or voluntary	Total
Intellectual disability mean score	25.6	13.5	21.5
Challenging behaviour mean score	8.9	5.8	7.8
N	740	367	1107

Table 3: Utilisation rates for non-accommodation services used by sample members and average weekly costs for users¹

	Utilisation rate (%)	Average weekly costs for users, £ (1996/7)
General hospital services		
General hospital outpatient	10.4	93.60
General hospital accident & emergency	7.3	25.96
Day activity services		
Intellectual disability hospital-based day activity	17.2	168.73
Work-orientated centre	11.1	0 ²
Day centre or social club (non-NHS)	39.3	74.01
Education centre	16.9	7.80
Drop-in centres	15.4	9.14
Other day care	29.8	29.15
Primary care and community support		
General practitioner	55.7	23.19
Dietician	25.2	0.25
Speech therapist	20.5	4.86
Occupational therapist	22.4	41.20
Psychologist	12.2	2.82
Psychiatrist	20.1	0.28

1. Services used by less than 5% of the sample are not listed.

2. We have attached zero cost to this service: see the costing methodology section for explanation
N=930

Table 4: Average weekly costs (£, 1996/97 prices) by service, per individual sample number

	Residential cost	Residential cost due to staff costs	Hospital services	Day activity	Community services	Total cost
NHS	665	455	10	77	27	779
Private & voluntary	444	268	2	72	13	532
All	588	388	7	75	22	692

N=930

Table 5: Predictors of service utilisation

Service	Age	Disability	Challenging behaviour	Average resident numbers	Private or Voluntary	Constant	Chi-square*	% Correct predictions	Users out of total cases
Hospital-based day activity		0.032 (0.001)		0.060(0.000)	-2.833(0.000)	-2.674(0.000)	120.0	83.8	83/1105
Work-orientated centre	-0.008(0.046)	-0.059 (0.000)		-0.056(0.000)			836.9	88.8	25/1117
Day centre/social club		-0.025 (0.000)	-0.032 (0.002)	0.017(0.000)			124.5	63.7	20/1108
Education centre		-0.065 (0.000)		-0.044(0.000)	0.574(0.000)		630.8	81.4	95/1117
Drop-in centres		-0.055 (0.000)		-0.062(0.000)	0.580(0.000)		628.9	81.4	04/1105
Other day care	-0.025(0.000)	0.014 (0.014)		-0.018(0.002)	0.580(0.000)		207.3	69.8	38/1105
Speech therapist	-0.016(0.009)	0.040 (0.000)		-0.016(0.028)		-1.383(0.000)	45.7	79.9	25/1117
Occupational therapist		0.027 (0.001)			-1.894(0.000)	-1.523(0.000)	126.6	78.2	46/1108
Psychologist	-0.018(0.035)	-0.023 (0.019)	0.116 (0.000)			-1.879(0.000)	65.3	88.2	30/1120
Psychiatrist		-0.022 (0.003)	0.085 (0.000)			-1.677(0.000)	46.9	80.4	19/1105
General practitioner	0.007(0.021)	0.014 (0.013)		-0.045(0.000)	0.625(0.000)		87.5	63.8	22/1105
Dietician		0.045 (0.000)	0.040 (0.002)	-0.101(0.000)	-1.428(0.000)	-1.266(0.000)	231.6	76.3	77/1108

*Chi-square test showing the improvement of using the model specified, compared to using only the constant as an independent variable.

Table 6: Regression analyses of cost variations

Variable	Coeff	SE	P	95% CI (BC)¹	
Sector (1 = NHS; 0 = private/voluntary)	371.51	38.15	<.001	297.67	447.19
Number of residents in home	2.48	0.95	.009	1.31	3.49
Sector x number of residents	-4.30	1.77	.015	-7.60	-0.57
Intellectual disability score	15.07	2.07	<.001	12.39	18.23
Challenging behaviour score	10.30	4.47	.021	1.87	18.02
Challenging behaviour score, squared	0.49	0.18	.006	0.13	0.82
Intellectual disability x sector	-8.30	1.80	<.001	-11.19	-5.56
Intellectual disability x number of residents	-0.16	0.06	.014	-0.26	-0.06
Intellectual disability x challenging behaviour	-0.57	0.12	<.001	-0.84	-0.33
Constant term	277.41	33.73	<.001	231.06	322.79
N = 930 R ² = .328 (= .328)					

1. Bias-corrected 95% confidence interval, from bootstrap regression (2000 replications)