

Changes in Health and Social Service use Among Three Samples of Older People in Inner London

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Introduction

Determinants of service use, and implications for costs among older people are highly topical. It has been estimated that 18% of lifetime medical costs occur during the last year of life, and a quarter of expenditure is accounted for in the last year of life¹. In some studies these effects are concentrated into the last one or two months of life^{2,3}. Longitudinal research using health insurance data in the USA has indicated that a small proportion of people account for a large proportion of medical care expenditure^{2,4,5,6,7,8,9}. However, in contrast to these earlier studies, Roos et al. (1987)¹⁰ showed that hospitalization costs in the months prior to death are essentially constant for all age groups. Lubitz and Riley (1993)¹¹ analysed Medicare payments in the USA for 1976, 1980, 1985, and 1988. They reported that payments for care in the last year of life held steady over time, and that there was a pattern of lower payments for older in comparison with younger decedents. The figures suggested that providers may have been reluctant to intervene with expensive, aggressive treatments for very old people. The study was limited in scope, however, and did not include nursing home payments not covered by Medicare (few are covered by the latter). Fries (1990)¹² has pointed to a fundamental methodological flaw in the higher cost predictions. He argues that for any given year of age there is a sub-group of those who will die within the year and a group who will survive. The first group will be expensive to care for. For each

Summary

This paper reports findings on changes in service use from a longitudinal study of ageing in an inner city area (Hackney, London) and a semi-rural area (Braintree, Essex) of England. The data reported here showed that few respondents stopped using services over time, particularly in Hackney. Those respondents in Hackney with the poorest level of functioning made the most use of services, although this association was weak among the Braintree sample members. At baseline, the Hackney samples made more use of services than the Braintree sample. Few respondents did not use services at all in both years. The longitudinal analyses confirmed that, among the two Hackney samples, those who made the heaviest use of services in both years were those with the poorest level of physical functioning, and there was no association with service use and level of functioning among the Braintree respondents. Few of the social network variables were associated with changes in service use, except network density. The multiple regression analysis modelled the effects of follow-up functional ability, number of health problems, network density, age, and sex on changes in service use. This showed that the largest amount of the variance between groups was explained by baseline service use, and that the other dependent variables explained little. Of these, functional ability explained the most, but this was only between 2%-5% of the variance. The model explained between 24%-32% of the variance; it was weakest in Braintree. Thus, most of the variance was left unexplained, indicating the complexity of predicting service use, suggesting that service use and provision are not strongly associated with all indicators of need. The Hackney respondents were more likely than the Braintree respondents to prefer help to be given by health and social services departments, rather than by relatives and friends, private or voluntary services.

Key words: Health services for the aged; Social work; Aged; United Kingdom.

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successive year of age, the relative proportion of these two groups changes so that there is a greater percentage of those who will die within the year and a smaller percentage who will live: 'this phenomenon entirely accounts for increased health care costs per year of age above age 65'. He continues that the error of economic studies of costs has been in assuming lower age-specific mortality rates, while also assuming constant age-specific health care costs.

This debate on costs has taken place largely in isolation from the debate about how best to meet the needs for health and social care. The disability which often accompanies extreme old age has inevitable implications for the need for, and use of, services^{1,13}. While research, from the early classic studies of old age to current findings, has reported that most older people rely on relatives for help with tasks of daily living where they are needed^{14,15,16,17}, they are one of the largest groups of consumers of community health and social services. On the other hand, surveys of service use have reported inconsistent findings in relation to associations with health status, psychological and medical condition and age^{8,14,15,16,17,18,19,20,21,22,23,24,25}. Studies in the USA and the UK have reported little difference between younger and older elderly in physician consultation patterns^{9,26,18,23,27}. One confounding variable in relation to analyses by age may be that very elderly people are the healthy survivors of their cohort, and therefore less likely to use services than a slightly younger cohort⁹. However, high service use among older people in the USA appears to be concentrated among a small proportion of all elderly people^{2,4,5,6,7,8,9}.

Research from the USA and the UK suggests that perceived need (perceived health status) and functional ability are the most strongly associated variables with utilization of medical services. Functional status is a predictor that has been reported to be associated with broad service use in the USA and in the UK^{23,24,28,29}. Apart from socio-demographic factors^{21,22,23,30,31,32,32}, there are several potential determinants of health service use, for example, the characteristics of the service, the social norms relating to illness and perceptions of medical technology, and individual illness behaviours³³. These factors have often been neglected.

Most of the research comes from the USA, with health services which are based mainly on private insurance systems, and results are difficult to interpret due to the large potential for sample bias.

The Study

The hypotheses underlying the analyses presented here are that increasing service use is associated with increasing need, as measured by level of physical functioning in relation to activities of daily living (ADL), number and type of health problems, reported need for help, and weak social networks, as measured by network size, composition, and availability of informal helpers.

Method

The results reported here are drawn from a study initially designed with the aim of assessing health and well-being, social and domestic circumstances, and need for health and social services among elderly people (aged 65<85) living in East London (City and Hackney) and Braintree in Essex (inner city and semi-rural areas respectively), and very elderly people (aged 85 and over) living in the same east London area. The areas from which the samples aged 65<85 were drawn are contrasting in relation to social deprivation figures from the 1981 and 1991 Censuses, with the inner city area scoring high on social deprivation indicators.

Sample members were followed up with the aim of documenting changes in physical health, psychiatric morbidity, service use, and social circumstances over a two-and-a-half- to three-year period. The analyses presented here describe associations with changes in service use. The strength of the study is its longitudinal nature, although it is limited, by the study definition, to people living in the community and, inevitably, to the probably healthier elderly people who survive into very old age.

All people aged 85 and over in 1987 who could be traced from Family Practitioner Committee (now Family Health Services Authority) records, and who were listed in the electoral rolls were eligible for inclusion in the study. The baseline responders consisted of 630 people aged 85+; 28 of these had proxy interviews, i.e. with their carers (70% re-

sponse rate). All baseline responders who were still alive and who were still living in the district were eligible for reinterview in 1990 ($n = 336$), and 263 people were successfully reinterviewed. Of these, 18 people had proxy interviews, and 11 were interviewed in institutions (the latter were analysed separately). The response rate was 78% (calculated out of the total of eligible survivors). Of the non-responders at follow-up, 22 people refused to be reinterviewed, 30 were untraced, and 21 people were either too ill to be interviewed or away.

The two 65<85-year-old samples comprised random samples of people in these age groups, also drawn from the (then) Family Practitioner Committee records. The baseline response rates for these two samples were 67% of sample members in Hackney (the 67% represents 464 people and includes 2 proxy interviews) and 82% of sample members in Braintree (representing 276 people). All contactable survivors who were still living in the district were eligible for follow-up interview ($n = 399$ in Hackney and $n = 251$ in Braintree); the response rates for the two younger samples respectively were 83% (representing 330 of the 399 eligible sample members who were still alive and living in the district, and also includes 2 proxy interviews) and 78% (representing 195 of the 251 eligible sample members, and includes 3 proxy interviews). Of the non-respondents aged 65<85 in Hackney, 22 people refused to be reinterviewed, 37 were untraced and 10 were either too ill to be interviewed or away; and in Braintree, 33 people refused, 15 were untraced and 8 people were too ill or away. Full details of the methodology have been reported elsewhere^{20,21,22,23,23,25}.

Scales measuring psychiatric morbidity, life satisfaction, functional ability, social networks and support, and other main variables were selected after a careful review of the literature, and were chosen after consideration of their levels of reliability and validity. These selected scales have been described in detail elsewhere^{20,21,22,23,24,25}. The functional ability scale^{34,35} asked respondents about their degree of difficulty with a list of personal care, domestic, and everyday tasks. The questions were phrased to measure ability rather than performance. Those who admitted any difficulty were then asked whether they received any help with this, and if so, who from and how often. In relation

to the measurement of psychiatric morbidity, the short 28-item version of the General Health Questionnaire was selected³⁶ because it has the advantage over depression self-report symptom scales in that it concentrates on broader components of non-psychotic psychiatric morbidity (e.g. anxiety and depression, apathy and agitation). It also permits analyses within sub-categories (psychosomatic health conditions, anxiety, self-worth and depression/suicidal thoughts), and has good reliability and validity. Respondents indicate on a four-point scale of severity the extent to which items reflect their usual state. Scores range from 0 to 28. Threshold scores on the scale are set to correspond with a case definition equivalent to the average patient referred to psychiatrists. The recommended threshold score is 4 or 5; the higher value of 5 was used in the analyses reported here in order to exclude false positive cases as far as possible. The proportion of respondents with scores above the threshold represents the probable prevalence of psychiatric morbidity. Life satisfaction was measured using Neugarten et al.'s Life Satisfaction Scale and Andrews and Withey's Delighted Terrible Faces Scale^{37,38}. The former measures overall life satisfaction by asking respondents to sort 20 statements about life on cards into those with which they agree/disagree; the score is 0-20, with the higher the score the better the life satisfaction. The latter involves respondents assessing current aspects of their lives by picking a face, the expression on which denotes how they feel about that aspect of life; the scale selected ranges from 1-35, with the higher the score the worse the life satisfaction. Social networks and social support were measured using a network grid to record network structure, supplemented with items on perceptions of and satisfaction with available support^{39,40}. Service use was measured by asking respondents about their use of, and need for, a list of individual health and social services, commonly provided in the UK.

Results were analysed using the mainframe version of the Statistical Package for the Social Sciences (Xth version) Univariate and bivariate statistics were carried out, including Chi-square tests, Pearson's product moment correlation, Spearman's Rank correlation, and Wilcoxon tests of significance; and multiple regression analysis was performed. Unless otherwise stated, attention has been

drawn to differences in distributions which satisfied at least the 5% level of significance using Chi-square and Wilcoxon tests.

Results

The characteristics of the samples at follow-up

In relation to the age structure of the three samples at follow-up, of the Hackney sample aged 85+ at baseline, 88% were aged 87 to 95 at follow-up, 9% were aged 95 to 100, and 3% were aged 100 or more. Of the Hackney sample aged 65 to 85 at baseline, 38% were aged 67 to 75 at follow-up, 56% were aged 75 to 85, and 6% were aged 85 to 87. The corresponding figures for the Braintree sample aged 65 to 85 at baseline were 50% aged 67 to 75 at follow-up, 46% aged 75 to 85, and 4% aged 85 to 87. Most sample members were female – 84% of the 85+ Hackney sample, 60% of the younger Hackney, and 70% of the younger Braintree sample. Just 9% of the 85 and over sample were married, in comparison with 38% and 41% of the younger Hackney and Braintree samples respectively; 65% of the 85+ and over sample lived alone, as did 51% and 40% of the younger Hackney and Braintree samples respectively. Most Hackney respondents lived in a flat or maisonette (80% of the 85+ sample and 84% of the 65 to 85 year old sample), while most of the Braintree respondents lived in a house or bungalow (82%). Most of the older and younger Hackney respondents lived in accommodation rented from the local council (69% and 66% respectively), while most Braintree respondents were owner occupiers (55%). The weekly income of the older Hackney sample at follow-up was £50 or less for 21%, £50<£100 for 78%, and £100 for 1%; for the younger Hackney sample the corresponding figures were 30%, 64%, and 6% and for the younger Braintree sample the corresponding figures were 26%, 64%, and 10%.

Functional ability (ADL), as would be expected, was worse among the older, 85+ sample at both baseline and follow-up interviews. For example, at baseline, 33% of the 85+ Hackney sample had a poor level of physical functioning, in comparison with 9% of the Hackney sample aged 65 to 85 at baseline, and 4% of the Braintree sample aged 65 to 85 at baseline; at follow-up, the proportion of respondents reporting a poor level of functioning had

increased markedly among the 85+ sample: 54% of the 85+ Hackney sample had a poor level of physical functioning, in comparison with 10% and 11% of the two younger samples respectively.

Six per cent of respondents living in Hackney who were aged 65<75 and 6% of those aged 75<85 were rated as mentally confused by interviewers, as were 11% of those aged 85+. In Braintree 2% of those aged 65<75 and 9% of those aged 75<85 were rated as mentally confused. At follow-up the numbers for all age groups were 10% of the Hackney sample aged 65<85 and 19% of the Hackney sample aged 85+. In Braintree 9% were rated as mentally confused. These respondents were not asked to complete the GHQ or other measurement scales, and where possible a brief proxy interview was conducted instead with a relative, but not included in the analyses presented here.

Changes in service use

Of the survivors at baseline, 84% of the 85+ Hackney sample, and 79% of the 65<85-year-old Hackney sample had seen their GPs in the last year, in comparison with slightly fewer (71%) of the Braintree respondents aged 65<85 (not statistically significant). At follow up, the comparable percentages were 82%, 89%, and 83% respectively. Table 1 shows the pattern of service use by type of other services across the three samples, with the 85+ sample using the most services, and the Braintree sample using the fewest.

Table 2 shows the changes in health service use between intervals. This shows that most of those, across the three samples, who used no services at baseline were using one or more services by follow-up, and in most cases the number used was two or more. Few respondents stopped using services.

Table 3 shows the changes in service use for social services. Of the 85+ sample who used no social services at baseline, 34% had started to use them, while for the two 65<85-year-old samples just 7% in each case had started to use services. Few stopped using them, particularly in Hackney.

Few respondents did not use services at all in both years. At baseline and follow-up, the Hackney samples made more use of all services than the Braintree sample. For example, among the Hack-

Table 1: Use of selected health and social services baseline and follow up (all respondents)

Service use	Hackney 85+ years				Hackney 65-85 years				Brentree 65-85 years			
	Baseline (total sample)	Baseline (survivors only)	Follow up		Baseline (total sample)	Baseline (survivors only)	Follow up		Baseline (total sample)	Baseline (survivors only)	Follow up	
	% (no)	% (no)	% (no)		% (no)	% (no)	% (no)		% (no)	% (no)	% (no)	
Current receipt of contact with service:												
District Nurse	17 (108)	13 (31)	33 (83)		7 (26)	7 (20)	10 (34)		2 (6)	1 (1)	3 (5)	
Home Help	54 (352)	48 (118)	63 (161)		22 (86)	21 (59)	25 (84)		8 (21)	6 (12)	11 (21)	
Meals on Wheels	19 (121)	17 (41)	25 (64)		7 (27)	7 (20)	5 (16)		3 (7)	1 (2)	2 (3)	
Chiropody	44 (287)	45 (109)	58 (147)		26 (101)	23 (67)	35 (117)		20 (55)	19 (36)	22 (43)	
Social Work	13 (83)	11 (27)	16 (41)		6 (24)	6 (16)	7 (22)		3 (7)	1 (2)	1 (2)	
Occupational Therapy	4 (26)	4 (9)	3 (7)		2 (8)	2 (6)	1 (4)		1 (4)	1 (1)	1 (1)	
Physiotherapy	5 (30)	6 (15)	3 (7)		4 (17)	4 (13)	2 (6)		2 (5)	1 (1)	2 (4)	
Health Visitor	9 (59)	9 (21)	11 (27)		5 (18)	3 (8)	4 (12)		4 (11)	1 (2)	-- (-)	
Hospital doctor	28 (171)	28 (69)	37 (93)		31 (121)	27 (77)	44 (146)		18 (50)	18 (34)	35 (67)	
Optician	38 (235)	40 (99)	52 (130)		40 (159)	40 (115)	67 (222)		63 (174)	66 (127)	74 (142)	
Dentist	16 (96)	18 (45)	21 (52)		22 (88)	21 (61)	36 (118)		30 (81)	31 (59)	31 (60)	
No. of respondents	614-649	243-245	249-256		394	287	329-332		275-276	193-194	192-193	

Table 2: Total no. of all health++ services used: baseline and follow up

		No. of all health services at baseline									
		Hackney 85+					Hackney 65-85				
No. of all health services used at follow up		0	1	2	3+	Total	0	1	2	3+	Total
		% (no)	% (no)	% (no)	% (no)	% (no)	% (no)	% (no)	% (no)	% (no)	% (no)
0		16 (8)	3 (2)	7 (4)	9 (6)	9 (20)	29 (25)	14 (12)	5 (3)	-- (-)	14 (40)
1		22 (11)	34 (20)	24 (13)	9 (6)	21 (50)	25 (21)	27 (24)	16 (10)	8 (4)	21 (59)
2		31 (16)	29 (17)	28 (15)	27 (19)	29 (67)	33 (28)	31 (27)	38 (23)	41 (20)	35 (98)
3+		31 (16)	34 (20)	41 (22)	55 (39)	41 (97)	13 (11)	28 (25)	41 (25)	51 (25)	30 (86)
Mean		1.94	2.10	2.22	2.58	--	1.294	1.852	2.344	2.633	--
No. of respondents		22 (51)	25 (59)	23 (54)	30 (70)	234	30 (85)	31 (88)	22 (61)	17 (49)	283
		Braintree 65<85									
		0	1	2	3+	Total					
		% (no)	% (no)	% (no)	% (no)	% (no)					
		21 (13)	18 (8)	8 (4)	-- (-)	14 (25)					
		36 (22)	54 (25)	21 (10)	14 (5)	32 (62)					
		28 (17)	18 (8)	54 (26)	31 (11)	32 (62)					
		15 (9)	10 (5)	17 (8)	55 (20)	22 (42)					
		1.361	1.217	1.792	2.417	--					
		32 (61)	24 (46)	25 (48)	19 (36)	191					

++ excludes GP, but includes hospital doctor, optician, dentist

χ^2 Hackney 85+: 20.61; 9 df; p<0.01
 Hackney 65<85: 50.27; 9df; p<0.00001
 Essex 65<85: 55.92; 9df; p<0.00001

Range: Hackney 85+: 0-14
 Hackney 65<85 0-6
 Essex 65<85: 0-4

Table 3: Total social service use: baseline and follow up

No. of social services used at baseline														

χ^2 Hackney 85+: 115.21; 9df; p<0.00001
Hackney 65<85: 182.50; 9df; p<0.00001
Braintree 65<85: 173.28; 4df; p<0.001

Range Hackney 85+: 0-4
Hackney 65<85: 0-3
Braintree 65<85: 0-2

= <1%

ney respondents aged 85+, just 13% did not use any health or social services at both baseline and follow-up, in comparison with 24% of the younger Hackney and 30% of the younger Braintree samples.

The proportions of respondents who did not use services at baseline, but who had started to use them by follow-up were similar across the three samples. For example, 77% of people aged 85+ in Hackney who did not use services at baseline had started to use them, and any decline in service use was relatively small overall, although 51% of those using 4+ and 54% of those using 5+ services at baseline used fewer at follow-up. In relation to the 65<85-year-old Hackney sample, 72% of those who did not use services at baseline had started to use them, and few of those using services at baseline had stopped using them; instead usage mainly increased. In relation to the Braintree sample, 79% of those who did not use services at baseline had started to use them, and again few who used services at baseline had stopped using them (detailed tables are available from the authors on request).

Unmet need

Few of the Braintree respondents with functional difficulties reported wanting (more) help with everyday tasks or personal care (up to 15% at follow-up wanted help with a named task), although more of both groups of the Hackney respondents said they would like (more) help. For example, at follow-up, up to 23% of the respondents aged 85+, and up to 25% of respondents aged 65 to 85 who had difficulties wanted (more) help with particular tasks (most frequently, among all samples, with cutting their toenails, washing self/bathing, housework, and odd jobs around the house). Most of the Hackney respondents (82%-88%) said that they would prefer this help to be given to them by health and social services professionals, rather than by their relatives and friends, private services, or voluntary services. In contrast, fewer (45%) of the Braintree respondents said they would prefer this help to be given by health and social services professionals, with the remainder divided equally between preferring the help to be provided by their relatives and friends or by private services; none of them wanted help from voluntary services.

In reply to a question about anything else that could be provided for them that would make it easier for them to maintain their independence at home, 39%-43% of the Hackney respondents, and 27% of the Braintree respondents at follow-up said 'yes'. Most of them mentioned aids and adaptations in the home (e.g. grab rails, higher chairs, trolleys, and various home improvements).

Associations with service use and changes in service use

Cross-sectionally, those respondents with the poorest levels of functioning, and those who reported the most health problems made the most use of services. In relation to the 85+ sample at baseline, 51% of those who used 3+ health and social services reported five or more health problems, in comparison with 35% who used two services, 29% who used just one service, and 22% who used no services. At follow-up, these proportions were similar. Similarly, in relation to this sample, 49% of those who used 3+ services at baseline had poor levels of functional ability, in comparison with 28% of those who used 2 services, 14% of those who used just one service, and 9% of those who used no services. At follow-up, these proportions had increased to 62%, 41%, 33%, and 27% respectively. However, there were no consistent differences between number of health problems and number of services used among the two younger samples. In relation to the younger Hackney sample, 18% of those who used 3+ services at baseline had poor levels of functional ability, in comparison with 11% of those who used 2 services, 5% of those who used just one service, and 5% of those who used no services. At follow-up, these proportions showed little change, at 18%, 3%, 6%, and 0% respectively. In relation to the Braintree sample, there were no differences in level of functioning and service use at baseline or follow-up.

Longitudinal analyses showed no consistent associations with type of physical or mental symptoms and changes in service use. In the older Hackney sample high users of services in both years were those with the worst functional ability scores in both years, and these differences did not achieve statistical significance with the younger Hackney sample. There were no associations with the Braintree sample (see Table 4).

Table 4: Changes in service use and functional ability

	Hackney 85+					Hackney 65-85					Braintree 65-85				
	Number of services used4++					Number of services used					Number of services used				
	Low but increasing users	Increasing users	Moderate users in both years	High users in both years	Decreasing users	Low but increasing users	Increasing users	Moderate users in both years	High users in both years	Decreasing users	Low but increasing users	Increasing users	Moderate users in both years	High users in both years	Decreasing users
	None used at baseline and 1+ used at follow up*** % (no)	Used 1-3 services at baseline and 4+ at follow up % (no)	Used 1-3 services at baseline and at follow up % (no)	Used 4+ services at baseline and at follow up % (no)	Used 4+ services at baseline but less than 4 at follow up*** % (no)	None used at baseline and 1+ used at follow up*** % (no)	Used 1-3 services at baseline and 4+ at follow up % (no)	Used 1-3 services at baseline and at follow up % (no)	Used 4+ services at baseline and at follow up % (no)	Used 4+ services at baseline but less than 4 at follow up % (no)	None used at baseline and 1+ used at follow up % (no)	Used 1-3 services at baseline and 4+ at follow up % (no)	Used 1-3 services at baseline and at follow up % (no)	Used 4+ services at baseline and at follow up % (no)	Used 4+ services at baseline but less than 4 at follow up % (no)
Functional ability score (ADL) baseline:															
Low (good)	50 (7)	29 (12)	48 (30)	-- (--)	2 (3)***	86 (41)	74 (26)	77 (100)	39 (7)	(2)	95 (39)	(5)	86 (82)	(4)	(--)
Moderate	36 (5)	48 (20)	28 (17)	34 (10)	46 (11)	8 (4)	23 (8)	15 (19)	28 (5)	(4)	5 (2)	(4)	9 (8)	(1)	(4)
High (poor)	14 (2)	23 (10)	24 (15)	66 (19)	42 (10)	6 (3)	3 (1)	8 (11)	33 (6)	(2)	-- (--)	(1)	5 (5)	(--)	(--)
Functional ability score (ADL) follow up:															
Low (good)	25 (4)	7 (3)	19 (14)	3 (1)	5 (1)**	83 (38)	60 (21)	68 (85)	18 (3)	(2)	91 (38)	(5)	74 (76)	(3)	(1)
Moderate	50 (8)	37 (16)	28 (20)	22 (8)	58 (11)	13 (6)	31 (11)	25 (31)	53 (9)	(3)	7 (3)	(3)	15 (15)	(1)	(2)
High (poor)	25 (4)	56 (24)	53 (39)	75 (27)	37 (7)	4 (2)	9 (3)	7 (8)	29 (5)	(2)	2 (1)	(3)	11 (11)	(--)	(2)
No. of respondents	14-16	39-57	62-84	33-40	19-26	46-49	32-37	124-133	17-20	7-8	41-42	10-11	95-102	4-5	4-5

++ Excluding GP

+++ Groups who were excluded from analysis due to small numbers from 85+ Hackney sample were those who used 1-3 services at baseline and none at follow up (n=4) and those who used none at baseline and none at follow up (n=5)

++++ Includes people who used no services at baseline and 4+ services at follow up (85+ Hackney (n=4); 65-85 Hackney (n=2))

+++++ Includes 2 people from 85+ Hackney sample who used 4+ services at baseline and none at follow up

** p<0.01

*** p<0.001

Ethnic status was analysed in the younger Hackney sample, as the larger numbers of respondents in different ethnic groups permitted this. Jewish respondents were most likely to have been moderate users of services at baseline and to have increased their service use at follow-up, i.e. to have used between one and three services at baseline, increasing to four or more services at follow up: 28%, in comparison with 13% of white Europeans and 10% of people in 'other' ethnic groups, although this did not achieve statistical significance. There were no other differences with ethnic status and changes in service use.

There was no consistent association with household size and changes in service use. Few of the social network and support variables were significantly associated with changes in service use, except with density at follow-up among the younger Hackney sample, and with wanting (more) help with ADL (among those with ADL problems) among the 85+ sample at baseline. For example, in relation to density, 21% of the high service users at both intervals had 0 or only 1 network members (density = 0), in comparison with 12% of moderate users, 5% of increasing users, and one in nine of decreasing users ($p < 0.001$). Of those with ADL problems who were high service users at both intervals, 75% wanted (more) help with ADL, in comparison with 58% of decreasing users, 35% of moderate users at both intervals, 34% of increasing users, and 8% of low but increasing users ($p < 0.01$).

Multivariate analyses

A multiple regression analysis was carried out with each sample in order to assess the independent contribution to changes in service use of functional status, number of health problems (in case of interaction effects), network structure (density), and age, and sex (in case of interaction effects). Functional status and network density were the variables which achieved statistical significance in previous analyses.

While changes in actual scores were analysed separately, it was decided not to enter simple changes into the model as their crude computation does not provide any information about the starting point (e.g. a change of plus 2 in ADL scores can mean an increase anywhere, which is relatively meaningless if respondents with such a wide range of actual

scores are grouped together). The dependent variable analysed was change in total service use. The covariates were functional status and number of health problems, network structure (density), age, and sex. The data were analysed hierarchically, with the physical health variables entered first, followed by network density, age, and sex. The ungrouped data (raw scores) were entered. The procedure used was residualised change analysis. This involves entering the baseline service use score as the first predictor examined, followed, in subsequent steps, by the remaining variables (see above). This procedure provides an estimation of the effects of the independent variables on changes in service use between baseline and follow-up.

In relation to the 85+ Hackney sample, baseline service use explained 19.17% of the variance between groups (Adjusted R^2). The addition of ADL explained a further 5.3% of the variance, although the addition of health slightly weakened the model. The addition of density contributed little, 1.64%; the addition of age explained only a further 2.20%, and sex added little. The total proportion of variance explained was 28.57%. The model was highly significant ($F = 5.22$; $p < 0.001$). In relation to the younger Hackney sample, baseline service use explained 25.11% of the variance (Adjusted R^2), and the addition of ADL explained a further 3.47%. The addition of health added little to the model; density explained a further 1.81%, age added a further 1.32%, and sex added little. The total percentage of explained variation was 32%. The model was highly significant ($F = 15.95$; $p < 0.0001$). In relation to the model for the Braintree sample, baseline service use explained 22.39% of the variance (Adjusted R^2), and the addition of ADL explained just a further 2.57%. The addition of health, density, age, and sex slightly weakened the model. The proportion of explained variance was 24%. The model was highly significant ($F = 11.36$; $p < 0.0001$). The final (sixth) model for each sample is shown in Table 5.

Summary and Discussion

The data reported here showed that most respondents had seen their general practitioners within the last 12 months, and consultation increased slightly over time for the two younger samples. The proportion of non-service users at baseline who had

Table 5. Regression+ of follow-up service use on baseline service use and follow-up variables ++ (final-sixth-models)

	Hackney 85 plus (n = 131) b	Hackney 65 to 85 (n = 197) b	Braintree 65 to 85 (n = 159) b
Baseline service use	0.41**** (5.89)	0.48**** (7.39)	0.42**** (6.76)
Functional ability (ADL)	0.02**** (4.42)	0.00 (1.38)	0.00* (2.01)
No. of health problems	-0.05 (-1.18)	0.06 (1.55)	0.01 (0.47)
Density	0.00* (2.22)	-0.00* (2.38)	-0.00 (-1.04)
Age	-0.12 (-2.48)	0.03* (2.30)	-0.00 (-0.43)
Sex	0.49 (1.49)	-0.26 (-1.46)	-0.13 (-0.79)
Constant	11.63	-1.62	1.41
R ²	31.03	34.16	26.76
Adjusted R ²	28.57	32.39	24.21

+ Residualised change analysis

++ t-values are presented in parenthesis below the unstandardised coefficients. All t-tests are 2-tailed

* p<0.05

**** p<0.0001

started to use services by follow-up was highest among the older 85+ sample. Few respondents stopped using services over time, particularly in Hackney.

Those with the poorest level of functioning made the most use of services, although this association was less strong in Braintree. Few respondents did not use services at all in both years. At baseline, the Hackney samples made more use of services than the Braintree sample. The longitudinal analyses confirmed that there were no consistent trends with changes in service use and number of health problems, although, among the two Hackney samples, those who made the heaviest use of services in both years were those with the poorest level of physical functioning. There was no association with service use and level of functioning among the Braintree respondents. Few of the social network variables were associated with changes in service use, except network density. However,

multivariate analysis showed that this contributed little. The multiple regression analysis modelled the effects of follow-up functional ability, number of health problems, network density, age, and sex on changes in service use. This showed that the largest amount of the variance between groups was explained by baseline service use, and that the other dependent variables explained little. Of these, functional ability explained the most, but this was only between 2%-5% of the variance. The model explained between 24%-32% of the variance; it was weakest in Braintree. Thus, most of the variance was left unexplained, indicating the complexity of predicting service use. On the other hand, earlier baseline analyses^{23,24} showed that household size was the most strongly associated variable with service use at baseline, although the data reported here shows that trends with household size and changes in service use were not consistent. Functional ability was the next strongest predictor, in support of the literature reviewed earlier, al-

though, as with the models presented here, its contribution was relatively small. The implication is that service use – and provision – is not clearly associated with indicators of need.

The analyses presented here indicate that, apart from level of functional ability, service use – and by implication, provision – was not strongly related to need as defined by number or type of health problems or broader social network structure, although there was a slightly stronger association with functional ability. The 85+ sample members who made heaviest use of services were the most likely, at baseline only, to report the need for even more help. Although baseline analyses reported an association between service use and household size, this association was not associated with changes in service use. The association with network density was weak, but indicated that those with weak density networks (e.g. loosely linked networks, with network members not knowing each other) made the highest use of services. This suggests that those with higher density networks had network members who communicated with each other and could probably coordinate the provision of informal help between them. Service use over time appeared to be predicted by service use at baseline. The debate on the predictors of service use and costs of care in the last year of life has drawn attention away from the individual needs for services – and quality of life – in that last year, despite evidence of unmet needs⁴¹, older people's reported needs to be helped to retain their independence^{42,43,44}, and their criticisms of the inflexibility of services⁴⁴. Some investigators have called for flexibility in service provision^{45,46}, with personal preference being taken into account^{48,49}. This philosophy is in line with the aims of the NHS and Community Care Act (1991)⁴⁷, which also emphasizes the accurate assessment of needs of potential clients for services. In conclusion, this research shows little association between needs and service use, except in relation to functional ability in the Hackney samples. Service provision should relate to wider health problems and should be sensitive to the weak links in people's broader social network structures. There was little evidence of this from the study reported here, despite the preference for statutory service provision among Hackney, although not Braintree, respondents.

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