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The Guy's/Age Concern Survey
Prevalence Rates of Cognitive Impairment, Depression and Anxiety in an Urban Elderly Community

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A sample of 890 people aged 65 years and over living at home in the Lewisham and North Southwark Health District was interviewed using a structured schedule containing CARE organic brain syndrome and depression scales, and items dealing with anxiety symptoms. Total prevalence rates were 4.6% for cognitive impairment, 13.5% for depression, 3.7% for generalised anxiety, and 10.0% for phobic disorders. Cognitive impairment increased exponentially with age, and was associated with lower occupational class. There was no significant association between occupational class and depression, generalised anxiety, or phobic disorder in this sample. Cognitive impairment, depression and agoraphobia were associated with significantly higher levels of dependency in the tasks of daily living.

The growing number of people aged 65 years and over in developed countries is presenting a major challenge to their health and social services. As a result of this 'demographic imperative', service planners are now examining how the limited resources available are to be used cost-effectively to provide an acceptable standard of treatment and care for this age group. In the elderly, mental disorder is a key factor affecting the use of acute hospital beds, the need for residential care and the demand upon domiciliary services. Conditions such as dementia, depression and anxiety influence decisions as to whether or not physical illness can be managed at home; they determine the capacity for self-care and the ability to perform the daily tasks of life; and, because of the practical and emotional burden imposed upon the family and neighbours, they may lead to institutionalisation or heavy investment in domiciliary services.

Epidemiological investigations of mental disorders in the elderly therefore have an important role in providing accurate and up-to-date information for planners (Henderson & Macfadyen, 1985). However, only a small proportion of the published studies provide data that are sufficiently reliable, detailed or comprehensive for planning purposes. In particular, information about the very old (over 75 years of age) is often not reported separately, or else is derived from small subsamples of the over-65s, as Morgan *et al* (1987) have pointed out.

Furthermore, few studies have looked at a broad range of mental disorders in the elderly. Cognitive impairment and depression have been extensively surveyed, but there is much less information available about other disorders, particularly anxiety states, in spite of the fact that they appear to be relatively common in old age. In the multi-centre Epidemiological Catchment Area (ECA) study in the United States, phobias were found to be the commonest disorder in women aged 65 and over, and the second commonest after cognitive impairment in men of this age (Myers *et al*, 1984). It is not known how disabling or distressing anxiety disorders are in old age, but their clinical importance may be judged from the fact that the elderly are among the heaviest consumers of anxiolytic drugs (Skegg *et al*, 1977; Catalan *et al*, 1988).

In 1986 the Section of Psychogeriatrics in the United Medical and Dental Schools (Guy's Campus), in conjunction with the Age Concern Institute of Gerontology, carried out a survey of the health and self-care capacity of elderly people living at home in the Lewisham and North Southwark Health District. The specific aims of this project were to establish for this population: the prevalence of cognitive impairment, depression and anxiety disorders; the nature and extent of physical health problems; levels of dependency and self-care capacity; and the utilisation and targetting of health and social services in this population. This paper reports the prevalence rates of cognitive impairment, depression and anxiety disorders estimated in this survey.

Method

The sample

The survey was conducted in the Lewisham and North Southwark Health District. This is a typical socially deprived segment of inner-city London; according to the Inner City Directorate of the Department of the

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Environment, on the basis of indicators derived from the 1981 Census data, Southwark is the tenth most deprived local authority in Greater London, and Lewisham is the twelfth. The elderly population of the district tend to be poor, and more socially isolated than those elderly living outside London. They are almost all white, born in the UK or Europe, and most have lived in the district for the major part of their lives.

At the 1981 Census the total population resident in the district was 311 959, including 50 241 (16.1%) aged 65 years and over. Of these, 19 147 (38.1%) were aged 75 years and over. For this survey the Electoral Register was chosen as the best sample frame available in the district. The projected sample size for the survey was approximately 1000 elderly subjects, so an initial random sample of 6178 names was drawn from the register. These individuals were screened by post to determine their date of birth. In order to maximise response to the postal screen, this enquiry was put in the context of a brief health questionnaire (Cartwright & Smith, 1987). Non-responders to this screen were sent a reminder, and non-responders to the reminder were followed up personally by the interviewers as part of the survey.

Most elderly people are included in the Electoral Register (Todd & Butcher, 1982), but boroughs vary in their methods of registering electors, and in some areas those with cognitive impairment might be at risk of dropping out or being excluded. The extent to which subjects with dementia were missing from the survey sample frame was estimated as follows. The names and addresses of the 101 patients presenting to an open-referral psychogeriatric community team in Lewisham in 1986 who received a clinical diagnosis of dementia were sought in the borough's Electoral Register for 1986 (qualifying date for entry 10 October 1985). Of those living at home at the time of referral, 83/88 (94%) were present in the register.

Instruments

The interview schedule consisted of structured questions and tests dealing with social and demographic factors, physical and mental health status, self-care capacity, dependency and utilisation of health and social services. Cognitive impairment and depression were assessed with slightly modified versions of the organic brain syndrome (OBS) and depression (D) scales of the CARE schedule, which have been extensively validated in community samples of the elderly by trained non-medical interviewers (Gurland *et al*, 1977; Gurland *et al*, 1984).

No equivalent means of detecting anxiety disorders in the elderly was available at the time of the survey, so a generalised anxiety (GA) scale was constructed for this survey, covering the areas of motor tension, autonomic hyperactivity, apprehensive expectation and hyper-vigilance. Where possible, items from existing scales were used or adapted, in particular the CARE schedule, the Present State Examination (PSE) (Wing *et al*, 1974) and the Geriatric Mental State (GMS) (Copeland *et al*, 1976) (Appendix 1). The interview schedule also contained items dealing with situational and specific fears. If any fears were present, subjects were asked about associated autonomic symptoms and phobic avoidance, and whether or not this was perceived by the subject as restricting (Appendix 1). No prior assumptions were made about what fears might be reasonable or unreasonable in this age group, and phobic disorders (Ph) were defined categorically as agoraphobic, social or specific fears with autonomic symptoms accompanying exposure to the phobic stimulus, or associated with restricting secondary avoidance. Panic attacks were rated separately, and panic disorder (PD) was defined according to DSM–III criteria (American Psychiatric Association, 1980). Post-traumatic stress disorder and obsessive–compulsive disorder were not rated in this survey.

The OBS scale consisted of test items, so it yielded a point prevalence of cognitive impairment. The D, GA, Ph and PD items were rated on the subjects' reported experiences in the month prior to interview, giving one-month prevalence rates for depression and anxiety disorders in this survey.

Validity and reliability

The validity and inter-rater reliability of the scales were assessed as part of the survey. Two validation exercises were carried out: a pre-survey pilot study of the schedule and a reinterview of a group of survey subjects. In the pilot study 21 elderly subjects were first interviewed by a member of the research team, using a schedule containing the OBS, D, GA, Ph and PD items, and then reinterviewed blind by a psychiatrist, using the PSE. None of these pilot subjects was subsequently included in the survey sample. In the survey validation, 33 subjects were reinterviewed blind by a psychiatrist, using the PSE.

The validity criteria were as follows: for the D scale a psychiatrist's clinical diagnosis of depression supported by a CATEGO-derived Index of Definition (ID) of 4 or more (Wing, 1976); for the GA scale a clinical diagnosis of generalised anxiety and an ID of 4 or more; for the Ph scale a clinical diagnosis of a phobic disorder and an ID of 4 or more; for the PD scale a clinical diagnosis of panic disorder and an ID of 4 or more; and for the OBS scale a clinical diagnosis of cognitive impairment alone. An ID of 5 or more implies that sufficient PSE symptoms are present for the CATEGO program to assign an ICD–8 diagnosis (Wing, 1976); an ID of 4 implies that specific symptoms are present, and is usually taken as the threshold between non-cases (ID 0–3) and cases. A higher cut-off point on the D scale was also validated against a clinical diagnosis of depression and an ID of 5 or more.

The relationship between these definitions of psychiatric disorder and functional impairment was estimated by a dependency scale of 13 self-report items concerned with self-care and domestic tasks derived from those used by Hunt (1978) (Appendix 2). Informant-rated scales of dependency were not used, since a substantial minority of elderly householders live alone. Where an informant was present, their observations were taken into account when rating these items. The internal consistency of the dependency scale was measured by Cronbach's α.

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TABLE I
Demographic characteristics of the sample compared with the total elderly population of Lewisham and North Southwark (1981 Census)

	Survey %	*1981 Census* %
North Southwark	26.6	27.9
Lewisham	73.4	72.1
Men	40.1	38.0
Women	59.9	62.0
Age 65–74	60.9	61.3
75–84	31.2	30.9
85+	7.9	7.8
Married	48.9	52.6
Non-married	51.1	47.4

TABLE II
Distribution of the sample classified according to age and sex

	Men	*Women*	*Total*
65–74	250 (28.0%)	292 (32.8%)	542 (60.9%)
75–84	92 (10.3%)	186 (20.9%)	278 (31.2%)
85+	15 (1.7%)	55 (6.2%)	70 (7.9%)
Total	357 (40.1%)	533 (59.9%)	890 (100%)

TABLE III
Validation coefficients for the organic brain syndrome (OBS), depression (D), generalised anxiety (GA) and phobia (Ph) scales

Scale cut-off point	*OBS 2/3* %	*D 7/8* %	*D 12/13* %	*GA 4/5* %	*Ph −/+* %
Specificity	98	90	98	98	93
Sensitivity	75	92	69	71	73
Positive predictive value	75	76	90	83	73
Misclassification rate	4	9	9	6	11

Procedure

Interviews were carried out between January and October 1986 by seven non-medical interviewers recruited for this survey (three men and four women). The interviewers were trained in the use of the interview schedule, in particular the OBS, D, GA, Ph and PD items. Before the survey proper, each interviewer completed a number of supervised and co-rated field interviews. The interviewers were also given a reference manual setting out coding instructions for the schedule items for use during the survey period. The mean duration of the survey interviews was 1 hour and 16 minutes (standard deviation ± 37 minutes).

The survey data were analysed by the Statistical Package for the Social Sciences (10th edn) (1986). All χ^2 tests include Yates' correction. Significant differences in dependency scores between groups were tested by the Mann–Whitney *U*-test, corrected for ties.

Results

The sample

Of 1113 individuals identified as born before 1921, 1030 were eligible for inclusion in the survey. Thirty had died, and the 53 ineligible subjects were those who had moved out of the district, or who were in residential care. Forty-seven subjects were not contacted. Of 983 individuals contacted, 892 were interviewed for the main survey (91 refused) and 890 interviews were completed, giving a response rate of 86% of those eligible.

The socio-demographic characteristics of the survey sample were comparable with those of the elderly population of the district in general, as given by the 1981 Census (Table I). The distribution of the sample classified according to age and sex matches that of the district population as a whole (Table II), so the prevalence estimates reported here are unweighted.

Validity and reliability

The results of the two validation exercises were similar, and the coefficients at the optimum cut-off points for both groups combined ($n = 54$) are given in Table III. These optimum cut-off points were: 2/3 for the OBS scale, 7/8 (ID 4+) and 12/13 (ID 5+) for the D scale and 4/5 for the GA scale. No cases of panic disorder were identified by either interviewers or psychiatrists in the validation samples.

The interviewers' inter-rater reliability, assessed by weighted κ, was 0.82 for the OBS scale, 0.90 for the D scale and 0.87 for the GA scale. For phobic disorders (Ph), assessed by Cohen's κ, the inter-rater reliability was 1.0 (no disagreements).

The reliability of the dependency scale in terms of its internal consistency (Cronbach's α) was 0.72. The interviewers' inter-rater reliability for this scale (weighted κ) was 0.90.

Cognitive impairment

Table IV shows the prevalence rates of cognitive impairment classified according to sex and age of subject. The rates of broad (OBS 3+) and narrow (OBS 6+) definitions of cognitive impairment were higher in women. The difference in the proportion of cases to non-cases for men and women was not significant at the 0.05 level, but a one-way analysis of variance of OBS score by gender did show a significant difference between scores for men and women (Kruskall–Wallis $H = 6.8$; $P < 0.01$). Of the men with OBS scores of 3 or more 28.6% were aged 65–74, compared with 18.5% of women with OBS 3+ scores.

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TABLE IV
Point prevalence rates (%) of cognitive impairment (OBS), classified according to sex and age of subject[1]

OBS score %	*Men*			*Women*			*Total*
	65–74	*75+*	*Total men*	*65–74*	*75+*	*Total women*	
3+	1.6 (±1.5)	9.3 (±5.6)	3.9 (±2.0)	1.7 (±1.5)	9.1 (±3.6)	5.1 (±1.9)	4.6 (±1.4)
4+	1.2 (±1.4)	3.7 (±3.6)	2.0 (±1.4)	1.4 (±1.3)	7.1 (±3.2)	3.9 (±1.7)	3.1 (±1.1)
6+	0.4 (±0.8)	1.9 (±2.6)	0.8 (±0.9)	0.3 (±0.7)	2.5 (±2.0)	1.3 (±1.0)	1.1 (±0.7)

1. Figures in parentheses give 95% confidence intervals.

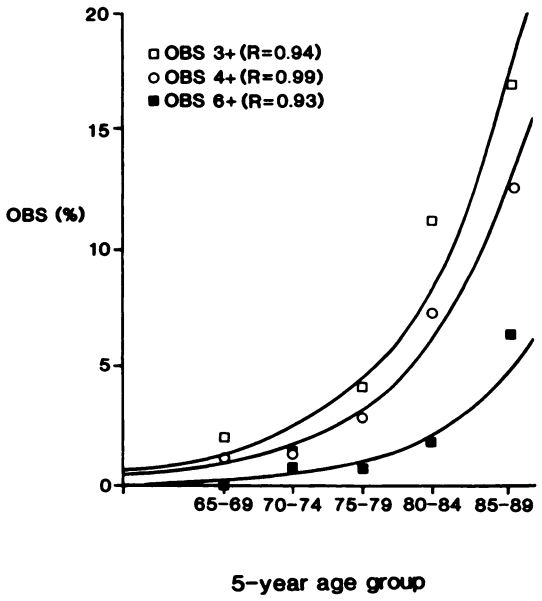


FIG. 1 Prevalence of three severities of cognitive impairment (OBS) for five-year age groups, with best-fit exponential plots.

In order to examine the association between age and the prevalence of cognitive impairment, rates for the five 5-year age groups from 65–69 years to 80–89 years were calculated for OBS cut-off points 3+ (mild–severe cases), 4+ (moderate–severe cases) and 6+ (severe cases only), and plotted against the median age of each age group (Fig. 1). At each cut-off point the increasing prevalence with age closely followed an exponential curve, with a doubling of the rate every 4.7–5.6 years (mean period = 5.3 years). The total number of subjects in the 5-year groups aged 90 and over was very small ($n = 22$), and the prevalence rates of cognitive impairment have very wide 95% confidence intervals (OBS 3+: 23% ± 19%; OBS 6+: 9% ± 13%). They have therefore been excluded from this analysis.

Table V gives the rates of cognitive impairment for different social classes in the sample, classified according to the Office of Population Censuses and Surveys (OPCS) classification of occupations (1970). The occupation determining social class was the last before retirement in all cases, either the subject's own in the case of men and single women or the spouse's for married and widowed women. There was a significant difference in rates between classes ($\chi^2 = 9.42$; $P < 0.05$; d.f. = 3), with higher rates in lower classes. This difference remained significant if non-single female subjects were classified according to their own rather than their spouses' previous occupations ($\chi^2 = 7.86$; $P < 0.05$; d.f. = 3).

Subjects with an OBS score of 3+ had significantly higher dependency scores than those with an OBS score of 0–2 ($z = 7.84$; two-tailed $P < 0.0001$) (Table VI). There was also a significant correlation between the OBS and dependency scores in this sample ($r = 0.38$; one-tailed

TABLE V
Prevalence rates of cognitive impairment, depression and anxiety disorders classified according to social class of subject

Class	*Total*	*OBS 3+*	*D 8+*	*D 13+*	*GA 5+*	*Ph+*
I/II	3	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
III N	157	2 (1.3%)	21 (13.4%)	10 (6.4%)	5 (3.2%)	17 (10.8%)
III M	455	18 (4.0%)	70 (15.4%)	22 (4.8%)	18 (3.9%)	48 (10.5%)
IV/V	219	16 (7.3%)	22 (10.0%)	9 (4.1%)	9 (4.1%)	21 (9.6%)
Other/?	56	5 (8.9%)	7 (12.5%)	3 (5.3%)	1 (1.8%)	3 (5.3%)

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$P<0.001$). The responses of 41.5% of the cognitively impaired subjects (OBS 3+) to the non-test survey items were corrected by informants, compared with 10.4% of the non-impaired subjects ($\chi^2=33.4$; $P<0.001$).

TABLE VI
Dependency score according to psychiatric classification (OBS, D, GA, Ph, no disorder) of subject

		Dependency score Mean	s.d.	Skewness
Cognitive impairment (OBS)	0–2	3.5	±6.2	2.11
	3–5	13.2	±10.9	0.42
	6+	19.0	±12.2	−0.04
Depression (D)	0–7	3.3	±6.4	2.40
	8–12	7.8	±7.9	0.82
	13+	10.1	±10.0	0.90
Generalised anxiety (GA)	0–4	3.9	±6.8	2.09
	5+	7.4	±7.5	1.17
Phobic disorder (Ph):				
Agoraphobia	—	3.7	±6.9	2.18
	+	6.6	±7.3	1.04
Social phobia	—	4.0	±7.0	2.07
	+	5.1	±6.3	1.14
Specific phobia	—	4.0	±7.0	2.06
	+	3.9	±6.4	1.66
No psychiatric disorder		2.8	±5.7	2.51

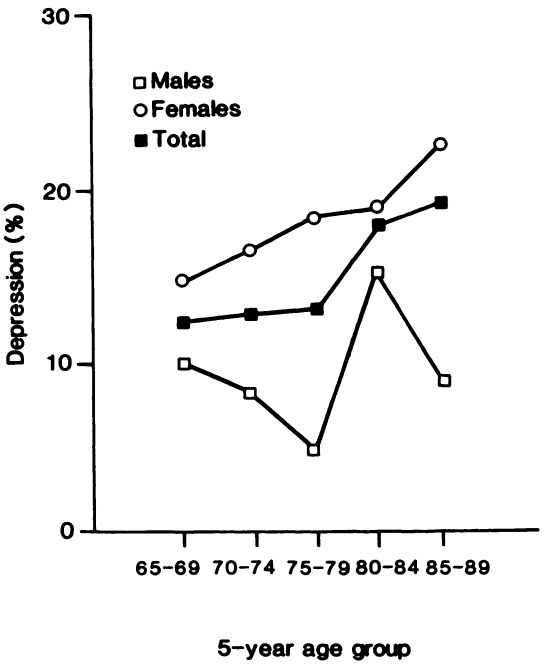


FIG. 2 Prevalence of depression (D 8+) for five-year age groups for males, females and the total sample.

TABLE VII
One-month prevalence rates (%) of depression (D) and anxiety disorders (GA, PD, Ph), according to sex and age of subject[1]

	Men			Women			Total
	65–74	75+	Total men	65–74	75+	Total women	
Depression (D 8+): %	8.8 (±3.5)	7.5 (±5.0)	8.4 (±2.9)	15.4 (±4.1)	18.7 (±4.9)	16.9 (±4.9)	13.5 (±2.2)
(D 13+): %	3.2 (±2.2)	1.9 (±2.6)	2.8 (±1.7)	5.1 (±2.5)	5.4 (±2.9)	5.3 (±1.9)	4.3 (±1.3)
Generalised anxiety (GA 5+): %	2.8 (±2.0)	1.9 (±2.6)	2.5 (±1.6)	4.4 (±2.3)	4.6 (±2.6)	4.5 (±1.8)	3.7 (±1.2)
Panic disorder (PD+): %	0.0 (±0.0)	0.0 (±0.0)	0.0 (±0.0)	0.0 (±0.0)	0.0 (±0.0)	0.0 (±0.0)	0.0 (±0.0)
Phobic disorder (Ph+):							
Agoraphobia: %	3.6 (±2.3)	2.8 (±3.2)	3.4 (±1.9)	11.0 (±3.6)	10.4 (±3.8)	10.7 (±2.6)	7.8 (±1.8)
Social phobia: %	0.8 (±1.1)	0.9 (±1.8)	0.8 (±0.9)	1.7 (±1.5)	1.7 (±1.6)	1.7 (±1.1)	1.3 (±0.8)
Specific phobia: %	0.8 (±1.1)	0.0 (±0.0)	0.6 (±0.8)	3.4 (±2.1)	2.5 (±2.0)	3.0 (±1.4)	2.1 (±0.9)
Total: %	4.4 (±2.5)	3.7 (±3.6)	4.2 (±2.1)	15.1 (±4.1)	12.4 (±4.2)	13.9 (±2.9)	10.0 (±2.0)
Total (D<8): %	2.4 (±1.9)	2.8 (±3.2)	2.5 (±1.6)	10.3 (±3.5)	6.2 (±3.1)	8.4 (±2.4)	6.1 (±1.6)

1. Figures in parentheses give 95% confidence intervals.

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Depression

The prevalence rates of depression (8+ and 13+ on the D scale), classified according to sex and age of subject, are given in Table VII. Depression was significantly commoner in women at the 8+ level of severity ($\chi^2 = 12.47$; $P < 0.001$), but at the 13+ level this difference in rates for men and women was not significant ($P > 0.05$). Figure 2 shows the relationships between depression (D 8+) and age (5-year age groups 65–69 to 85–89) for men, women and both sexes combined. Rates rose with age in women, but in men they fell until the 75–79 age group was reached, before rising in older groups. These age-related trends were not significant at the 0.05 level. There was no significant association between depression and social class at either the 8+ or 13+ level of severity (Table V).

There was a slight but statistically significant correlation between the depression and OBS scores in this sample ($r = 0.13$; one-tailed $P < 0.001$); there was no significant association between cases of depression (D 8+) and cognitive impairment (OBS 3+).

Subjects with a D score of 8+ had significantly higher dependency scores than those with a D score of 0–7 ($z = 8.72$; two-tailed $P < 0.0001$) (Table VI). There was a significant correlation between the D and dependency scores ($r = 0.37$; one-tailed $P < 0.001$).

Anxiety

The prevalence rates of generalised anxiety disorder classified according to sex and age of subject are given in Table VII. The highest rate of generalised anxiety (GA 5+) was found in the female 75+ year age group, but the differences between the rates for men and women and the different age groups were not significant at the 0.05 level. There was no significant association between generalised anxiety and social class (Table V).

Generalised anxiety and depression scores were significantly associated ($r = 0.68$; one-tailed $P < 0.001$), as were cases of generalised anxiety (GA 5+) and depression (D 8+) ($\chi^2 = 149.1$; $P < 0.001$). Only three subjects (9.1% of those with generalised anxiety) had depression scores of less than 8. There was no association between cognitive impairment (OBS) and generalised anxiety (GA) scores ($r = 0.05$; NS). Subjects with a GA score of 5+ had higher dependency scores than those with a GA score of 0–4, but this difference was not significant at the 0.05 level ($z = 1.84$; $P = 0.07$).

Panic attacks were not common in this sample. Nobody met the DSM-III criteria for panic disorder (Table VII), and only one subject (0.1%) had experienced a panic attack in the month prior to interview.

The prevalence rates of agoraphobia, social phobia and specific phobia are given in Table VII. Social phobia was the least common class of phobia in this sample, and 6/12 (50%) were also agoraphobic. Agoraphobia was significantly commoner than specific phobias in the survey sample ($\chi^2 = 34.0$; $P < 0.001$). Phobic disorders (all types) were significantly commoner in women ($\chi^2 = 21.21$; $P < 0.001$). The rate was higher in the 65–74 year age group than in those aged 75 and over, but this difference was not significant at the 0.05 level. Phobic disorders were not significantly associated with social class (Table V).

TABLE VIII

One-month prevalence rates of particular fears in subjects with agoraphobia and specific phobias

	n	%
Agoraphobia		
Going out of the house	37	53.6
Travelling	32	46.4
Enclosed spaces	25	36.2
Being alone at home	23	33.3
Being with other people	8	11.6
Meeing other people	7	10.1
Other	11	15.9
Total	69	100.0
Specific phobia		
Spiders/insects	6	33.3
Cats/dogs	5	27.7
Blood/injury	1	5.6
Heights	1	5.6
Other	5	27.7
Total	18	100.0

Table VIII gives the prevalences of particular fears in the phobic subjects. An additional 83 subjects in the sample (9.3%) had similar fears associated with non-restricting secondary avoidance. Depression (D 8+) was significantly commoner in subjects with phobic disorders; 39.3% of phobic subjects were depressed compared with 10.6% of non-phobic subjects ($\chi^2 = 54.18$; $P < 0.001$); 6.1% of the total sample were phobic but not depressed (Table VII). There was no association between cases of cognitive impairment (OBS 3+) and phobic disorder (Ph+) ($\chi^2 = 0.05$; NS).

Subjects with agoraphobia had significantly higher dependency scores ($z = 4.97$; two-tailed $P < 0.0001$) than those without, but there was no significant difference between the dependency scores of those with social phobias ($z = 1.27$; NS) or specific phobias ($z = 0.11$; NS) and the rest of the sample (Table VI). Of those subjects who were permanently housebound, 3/29 (10.3%) had agoraphobia.

Overall, 77% of the survey sample were psychiatrically fit to the extent that they did not meet the survey criteria for cognitive impairment, depression or anxiety disorders. This group of subjects had the lowest mean dependency score (Table VI), and their dependency scores were significantly different from those of subjects with cognitive impairment (OBS 3+; $z = 8.6$; $P < 0.0001$), depression (D 8+; $z = 9.5$; $P < 0.0001$) and agoraphobia ($z = 6.0$; $P < 0.0001$). The dependency scores of subjects with social and specific phobias did not differ significantly from those of the psychiatrically fit.

Discussion

The prevalence rates reported here are only estimates of the actual rates in the particular elderly population

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surveyed. Errors due to biased sampling, sample size, non-response, refusals and false-positive or false-negative case identifications are unavoidable in any survey, and in this study they have been acknowledged and quantified where possible. Sample frame bias is a potentially important source of error which may be false positive if ineligible subjects are included in the frame, or false negative if eligible subjects are excluded. The Electoral Register was chosen as the sample frame for this survey, since the local registration practices suggested that using the electoral rolls of Lewisham and North Southwark was likely to result in less overall frame bias than available alternatives such as the District Family Practitioner Committee list. Cognitive impairment did not appear to be associated with a high rate of non-inclusion in the Electoral Registers of the district, since an independent check showed that only 6% of the demented individuals presenting to one of the district psychogeriatric services during the survey period were not registered. Non-response and refusal rates were also acceptably low, and the demographic characteristics of the final sample were similar to those of the total elderly population of the district, as given by the 1981 Census. The effect of sample size upon the reliability of the reported prevalence rates of disorders for the various age groups is reflected in the 95% confidence intervals quoted in Table VII.

Comparison between surveys is difficult because methods and instruments differ between studies. To facilitate comparison, this survey chose instruments (the OBS and D scales of the CARE schedule) that had been developed, used and validated in the Cross-National Geriatric Community Survey of Gurland *et al* (1983), and that have been used and validated in other community and residential surveys of the elderly. Some of the items were slightly reworded in this survey, so the validity and reliability of these scales were checked, along with the new GA and Ph scales for identifying generalised anxiety and phobic disorders. The scales performed well against the validating criterion of a blind psychiatric diagnosis, supported in the case of the D, GA and Ph scales by a CATEGO-derived ID of 4 or more. The inter-rater reliability was high for all four scales.

If epidemiological surveys are to be useful to health care planners, they must establish explicit relationships between the prevalence of operationally defined psychiatric disorders and the resulting levels of functional impairment and dependency that determine the need for services. This study has found that the subjects meeting its criteria for cognitive impairment, depression and agoraphobia have significantly higher mean levels of dependency, which suggests that these case definitions are of both practical and theoretical value. The index of dependency used in this study is based largely on self-report, so the level associated with cognitive impairment is probably an underestimate.

Cognitive impairment

Until recently, surveys of elderly people have been reasonably consistent in finding a prevalence rate of about 5% for moderate/severe cognitive impairment in those aged 65 and over, and about 20% in those over 80. For example, in their much-quoted 1960 Newcastle survey, Kay *et al* (1964) found that 5.6% of over-65s and 22.0% of over-80s had a 'severe' organic brain syndrome. These influential figures have provided the basis for health service planning for the elderly mentally infirm for many years, but recent studies suggest that they may be too high (Ineichen, 1987). For example, Gurland *et al* (1983) found a point prevalence of 2.3% for 'pervasive dementia' in their London sample of subjects aged over 65, and Morgan *et al* (1987) reported a prevalence of 3.2% for cognitive impairment in their community sample of over-65s in Nottingham. Clarke *et al* (1986) found a prevalence of 'marked cognitive impairment' of only 4.5% in their survey of all over-75s in Melton Mowbray, Leicestershire. The prevalence rates reported here support these recent studies; 4.6% of the total sample had a CARE OBS score of 3 or more and only 1.1% scored 6 or more.

In some surveys, the lower prevalence rates quoted for 'dementia' reflect more stringent criteria for case definition. However, brief mental state tests such as the OBS scale used in this study merely detect cognitive impairment and will overestimate the prevalence of dementia, since in a proportion of cases this cognitive impairment will be the result of non-progressive or reversible conditions such as mental handicap, head injury, delirium or affective disorder. In this survey, for example, there was good evidence in at least two cases (4.9% of those with OBS 3+) that the cognitive impairment was not due to dementia; one patient was severely depressed and the other had a non-progressive deficit as the result of surgery to remove a cerebral tumour many years previously.

Another explanation for the low prevalence rates of cognitive impairment in this survey is that the sample frame excluded institutional populations, where the rates of dementia are known to be much higher. While it is true that dementia is common in those in residential and long-stay hospital care (Mann *et al*, 1984), the absolute numbers are relatively small compared with the general population; Kay & Bergmann (1980) have estimated that approximately

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20% of all those with dementia live in hospitals or other institutions. However, where local services are particularly proficient at identifying elderly people with dementia and removing them into institutions, the effect on the prevalence rates of cognitive impairment in the elderly in the community will be greater. In general, excluding institutional populations from the investigation will have the greatest effect on the rates found for the very elderly, who are over-represented in institutions, but in this context Clarke *et al* (1986) found their low prevalence of cognitive impairment in a total-population sample of over-75s, both at home and in institutions.

The downward shift in the consensus estimate for the prevalence of dementia in recent years despite increased survival (Christie, 1985) may reflect a real change in incidence, although in the absence of strictly comparable methodologies we must be cautious about over-interpreting these "straws in the wind" (Arie, 1988). Incidence studies are few, and results from the total-population Lundby Study, suggesting that the incidence of dementia has fallen over the last 25 years (Hagnell *et al*, 1983), have since been called into question (Rorsman *et al*, 1986). If the incidence of dementia is falling, this may be a cohort effect, the result of new generations with different habits and experiences moving into the at-risk age groups. Factors associated with lifestyle such as diet, smoking, alcohol consumption, employment history and leisure pursuits (for example, boxing) may be relevant, particularly in the aetiology of cerebrovascular and traumatic dementias (Arie, 1988). Such factors might also account for the social class gradient in the prevalence of cognitive impairment apparent in this and other studies (Cooper & Sousa, 1983; Weissman *et al*, 1985), but the validity of survey instruments used to detect cognitive impairment also varies across educational groups, and this biases case finding to an unknown extent (Gurland, 1981).

If lifestyle factors are important in the aetiology of cognitive impairment, it might be expected that in the elderly there would be a difference in prevalence rates for men and women, since the first modern generation of women with sizeable numbers of habitual smokers, drinkers and employees is only now entering old age. On this point, the existing evidence is rather inconsistent; Neugebauer's review (1980) found that the female:male ratio in ten studies ranged from 1.64 to 0.17. It may be that age at onset of dementia is an important intervening variable; Kay & Bergmann (1980) have suggested that men are more prone to an early-onset cerebrovascular dementia, whereas women suffer mainly from later-onset 'senile dementia'. In a review of four studies they point out that 27% of the demented males were 65–74 years old, 88% of whom had been assigned a diagnosis of 'arteriosclerotic dementia'. Of the demented women, however, only 11% were 65–74 years old, with 43% of these diagnosed as 'arteriosclerotic'. This study found a significant difference in overall OBS scores for men and women, but not in the rates of cases of cognitive impairment. Of those with an OBS score of 3 or more, 28.6% of the men were in the 65–74 year age group compared with 18.5% of the women, which is consistent with the pattern described by Kay & Bergmann (1980). No attempt was made to distinguish between Alzheimer's disease and cerebrovascular dementia in the design and analysis of this survey, since a reliable distinction is not yet possible in field studies (Henderson & Jorm, 1987).

The different prevalence estimates for cognitive impairment in different studies may reflect real differences in the prevalence of dementia at different geographical sites. Very few physical or mental disorders have a uniform prevalence worldwide, and there is no reason to assume that the rates of dementia are the same everywhere. Indeed, there is evidence that the prevalence rates of dementia do in fact differ for different populations; Copeland *et al* (1987*c*) found a difference in the rates of 'pervasive dementia' for New York (4.9%) and London (2.3%) by comparable methods. By the same token, there appear to be differences between populations in the prevalence of particular types of dementia (Hasagawa *et al*, 1986). Differences in the prevalence of dementia between survey sites may reflect different survival rates, or they may be due to different rates of incidence. Future comparative studies will be important in formulating and testing aetiological hypotheses.

While estimates of the prevalence of cognitive impairment may vary between studies, there is good agreement on the rate at which it increases with age. Dementia increases exponentially rather than linearly with age (Fries, 1984), and the rates of increase at all levels of cognitive impairment in this survey (Fig. 1) agree closely with the meta-analysis of Jorm *et al* (1987), whose best-fit exponential model derived from 22 studies had a doubling time of 5.1 years, irrespective of methodology. Our findings support their suggestion that a relatively small survey of one five-year age group of septuagenarians in any given elderly population may be sufficient to estimate by projection the prevalence rates of dementia at other ages.

Depression

The overall prevalence rates of depression found in this survey are in line with those found in other

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comparable studies. For example, using the OARS depression scale, Blazer & Williams (1980) found 'substantial depressive symptoms' in 14.7% and 'major depressive disorder' (DSM-III) in 3.7% of their community sample of over-65s in Durham, North Carolina. Similarly, in the Cross-National survey (Gurland *et al*, 1983) the prevalence of 'pervasive depression' was 12.4% in London and 13% in New York. Applying the AGECAT diagnostic computer program to the merged London/New York data, the prevalence of 'diagnostic syndrome cases' of depressive neurosis in these subjects was 15.2%, and that of depressive psychosis was 2.5% (Copeland *et al*, 1987*b*).

As with most studies, our survey has found higher rates of depression in females, but this difference in rates for men and women was significant only for the broad category (D 8+). The absence of a significant difference in rates for men and women at the more severe level of depression (D 13+) may simply reflect the smaller number of cases, or it may indicate real differences in aetiology or mortality between mild and severe forms of the disorder.

In this survey the prevalence of depression (D 8+) in females rose across successive five-year age groups until the 85–89 age group was reached. The cross-sectional trend in males was more variable, with a drop in rates until the 75–79 age group was reached, and higher rates in subsequent five-year age groups. Overall, the rate of depression increased with age until the 85–89 age group was reached (Fig. 2), with some evidence of a decreased rate in nonagenarians. Gurland *et al* (1983) found a similar association between age and depression in males, but in their London sample the rate of depression in females fell with advancing age. Since these studies are broadly comparable, the similarities and differences are worth examining. There is agreement that the prevalence of depression troughs in the eighth decade in men. Gurland *et al* (1983) found that this age pattern was also shown by physical illness in men, and they considered that the variation of depression with age was best explained by its relationship with physical illness. It may be that the trough in the rate of depression in males is due to the increased mortality of depressed men in their sixties and early seventies, reducing the surviving population at risk of depression. Increasing chronic physical ill-health in the 70s and 80s is likely to be associated with higher rates of depression, but as the most physically and psychiatrically robust individuals survive into extreme old age depression may become less prevalent. The main difference between the studies is in the association between age and depression in females. Gurland *et al* (1983) found that their age profile was more consistent with environmental disadvantage and isolation than with physical illness, so the different findings in this study may reflect local variations in these factors. Alternatively, the differences may be due to cohort effects, since our sample of over-65s is 14 years younger than that studied by Gurland *et al* (1983). Recent cross-sectional studies in the United States have also found increased rates with age in the elderly population (Kramer *et al*, 1985).

The relationship between depression and socio-economic status in the elderly is also complex and the evidence is not consistent. Some studies, for example Warheit *et al* (1973), Blazer & Williams (1980) and Murrell *et al* (1983), have demonstrated a significant association between late-life depression and indicators of lower socio-economic status, but others have not (Gurland *et al*, 1983). The present survey found no association between occupational class and depression, either at the 8+ or the 13+ level of severity. Weissman & Myers (1978) have commented that the association between depression and social class varies according to the type of disorder surveyed; studies where symptom scales or measures of general psychiatric morbidity were used have found a consistent relationship with lower social class, but with narrower case definitions of depression this association is weak or non-existent. There were only three subjects in classes I and II in this sample, so this sample was not representative of the entire social spectrum. It may be that physical ill-health is an important intervening variable in the relationship between depression and social class in old age (Murphy, 1986).

Depression and cognitive impairment are associated in clinical populations (Post, 1962), but less is known about their relationship in community samples. This survey supports the finding of Kay *et al* (1985) that, while there may be a significant correlation at the level of symptom scores, there is no association between cases. In clinical populations, the coexistence of symptoms of depression and cognitive impairment is usually the result of depressed mood superimposed upon moderate levels of dementia, rather than impaired cognitive testing due to severe depression (Reiffler *et al*, 1982), and the same is probably true of community samples.

Anxiety

The hierarchical nature of modern classifications of anxiety states such as ICD-9 and DSM-III means that most cases of generalised anxiety disorder (GAD) are subsumed under either depression, phobic anxiety, panic, or post-traumatic stress disorders,

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and it no longer has much status as an independent diagnostic entity. There have been few modern estimates of its prevalence, particularly in the elderly, and differences in case definition have resulted in a wide range of values. Using a self-rated symptom checklist (the SCL-90), Uhlenhuth *et al* (1983) identified DSM-III-like 'generalised anxiety' in 7.1% of subjects aged 65–79 in the United States. In their community sample of elderly subjects living in Liverpool, however, Copeland *et al* (1987*a*), who used the GMS-AGECAT package, found a prevalence of non-phobic 'anxiety' of only 1.1%. Generalised anxiety as defined in the Guy's/Age Concern survey was present in 3.7% of the sample. The generalised anxiety score was strongly correlated with the depression score, and there was a significant association between cases at the GA 5+ and D 8+ levels. However, a small number of cases of generalised anxiety were not depressed. Tyrer (1984) has criticised the "wholesale slaughter of anxiety neurosis as a diagnostic entity", pointing out that generalised anxiety as a syndrome seems to be currently unpopular because there are no specific treatments. Under the new criteria set out in DSM-III-R (American Psychiatric Association, 1987) GAD may be diagnosed in the presence of other mood and anxiety disorders, but it remains a diagnosis of exclusion in ICD-10.

Panic disorder is a diagnostic classification that is applied to those cases of anxiety neurosis that are characterised by sudden, recurrent attacks of anxiety. Panic attacks are episodes of intense anxiety accompanied by autonomic symptoms, and often result in avoidance behaviour. For a subject to meet the DSM-III (American Psychiatric Association, 1980) criteria for panic disorder there must be three such attacks within a three-week period. As with DSM-III generalised anxiety disorder, the diagnosis can only be made in the absence of other physical or mental disorders such as depression, schizophrenia or agoraphobia. According to the ECA study, the onset of panic attacks and panic disorder peaks at 15–19 years, and they are rarely encountered in community populations of elderly people (Von Korff *et al*, 1985), a finding confirmed by this survey. Only one subject had experienced a panic attack in the month prior to interview, and he was also depressed.

With regard to phobic disorders, however, this survey supports the conclusion of Myers *et al* (1984) that they are relatively common in the elderly, particularly in women. At the Baltimore site of the ECA study, the prevalence of DSM-III phobias was 12.1% in subjects aged 65–74 and 10.1% in over-75s (Kramer *et al*, 1985). After adjustment for different diagnostic criteria, the rates reported here for phobias in non-depressed subjects are lower than these, but rather higher than those of some previous studies. Weissman *et al* (1985) found a prevalence of 3.9% for DSM-III phobic disorder (all types) in their elderly New Haven sample, Uhlenhuth *et al* (1984) found phobias broadly meeting DSM-III criteria in 3.1% of the subjects aged 65–79 in their United States sample, and the prevalence of DSM-III phobia in an elderly sample in Edmonton, Canada, was 3.0% (Bland *et al*, 1988). Others have reported even smaller prevalences of phobic anxiety in samples of elderly subjects; for example, Copeland *et al* (1987*b*), who used the GMS-AGECAT package, found a case prevalence of only 0.7%. These differences may reflect different severity criteria, since the prevalence of 5.6% reported by Copeland *et al* (1987*b*) for cases plus subcases is more comparable with this study. They may also be the result of other differences in case definition; for example, the GMS specifically asks the raters to exclude those fears that they consider reasonable in the elderly, such as fear of going out because of a fear of mugging.

For similar reasons, it is likely that health services fail to recognise phobic disorders in the elderly. Disabling fears in old people may be dismissed by the subject, their family and others as being 'reasonable for their age', and the secondary avoidance compensated for by the provision of well-meaning but misguided home support. As Bergmann (1971) has pointed out, an increased need for social support is an important expression of neurosis in old age and is often an inappropriate and ineffective response to the problem. Phobic avoidance may be a significant cause of houseboundness in the elderly; Exton-Smith *et al* (1976) found that 20% of his sample of housebound elderly had no physical reason to keep them indoors, 'nervousness' and 'loss of confidence' being given as explanations instead. In this sample, agoraphobia was associated with significantly higher dependency scores, and 10.3% of those who were permanently housebound were agoraphobic. Specific phobias were not associated with high levels of functional impairment.

Elderly people are properly cautious of threats and danger in their environment, but there is no evidence to suggest that a chronic state of fear with disabling generalised avoidance is a normal or inevitable consequence of the ageing process. Although some fears, for example, fear of street crime (Harris, 1975), are common in the elderly, the rates of phobic disorder found in this study are low in comparison. Less than 20% of the total sample coped with frightening objects or situations by avoiding them.

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Over one-third of subjects with phobic disorders in this sample were also depressed, which emphasises their clinical significance since in many cases this depression appeared to be secondary to the restrictions imposed by their phobic avoidance. Little is known about the particular causes and effects of phobic disorders in old age, and the phobic subjects identified in this sample are being studied further.

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Appendix I

(A) Generalised anxiety — Score

(1) (a) Have you had any headaches in the past month?
IF YES: Do you know what brought it/them on? Did worrying help to bring it/them on?
(b) Has worry brought on any other aches or pains in the past month?
Headache/other pains due to worry — 1

(2) In the past month have you felt so fidgety or restless that you couldn't sit still?
IF YES: Do you know what brought it on? Was it due to worry, fear or something else?
Restlessness due to worry/fear/anxiety — 1

(3) Could you tell me if you've had any of the following symptoms in the past month?
(a) Noticed your heart racing or thumping
(b) A sinking feeling in your stomach
(c) Difficulty catching your breath, even though you weren't exerting yourself
(d) A choking lump in your throat
(e) Felt as if you were going to faint
(f) Attacks of hot or cold feelings, or sweating or blushing
(g) Any tingling or numbness of the fingers or toes.
IF YES: Do you know what brought it on? Was it due to worry, fear or something else?
One or more symptoms due to worry/fear/anxiety — 1

(4) How often, if at all, have you worried in the past month?
Never — 0
Some days — 0
Most days — 1
All the time — 1

(5) In the past month, have you had any difficulty getting up in the morning because you felt afraid to face the day?
Has felt afraid to face the day — 1

(6) In general, would you describe yourself as a worrier?
Admits to being a worrier — 1

(7) Have you felt on edge, strung up or mentally tense in the past month?
Never — 0
Some days — 0
Most days — 1
All the time — 1

(8) Do you take anything to help you relax? What about sedative tablets or alcohol?
Takes medication or alcohol to relax — 1

(9) Have you had any difficulties with sleeping lately, that is, in the past month?
IF YES: What is it that prevents you from sleeping, or wakes you up?
Sleep difficulty due to worry/anxious thoughts — 1

What goes through your mind when you are lying awake? Do you have trouble sleeping because you feel tense, or have worrying thoughts?

(10) Have you in the past month had any frightening dreams that have woken you up
Has had nightmare in past month — 1

(11) During the past month, have you felt more irritable or angry than usual, or about the same as usual, or less angry or irritable?
More angry/irritable — 1

(B) Phobic disorders

(1) Some people get very worried or frightened by particular situations. I'm going to read out a number of things and I'd like you to tell me, please, for each one whether that kind of thing usually makes you feel *very* worried or anxious, or not.
(a) Going out of the house/flat
(b) Being alone at home
(c) Enclosed spaces, places that are shut in
(d) Being with other people
(e) Having to meet other people
(f) Any kind of travelling
(g) Is there any other situation that makes you feel very worried or anxious?

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IF YES TO ANY OF THE ABOVE:
Have you actually (been in feared situation/s) in the past month?

IF YES: What kind of feeling did you get when you were?
For example, did your heart thump, did you go hot and cold, or what?

IF NO: Have you avoided (the feared situation/s) in the past month, or would you have avoided it if the situation had arisen? Does the fact that you have to avoid (the feared situation/s) mean that you can't do certain things that you'd like to do, or need to do?

(2) Do you have any special fears, like some people are afraid of spiders, birds or blood?

IF YES:
Have you actually been frightened by (feared object/s) in the past month?

IF YES: What kind of feeling did you get when it happened?
For example, did your heart thump, did you get a choking feeling in your throat, or what?

IF NO: Have you avoided (feared object/s) in the last month, or would you have avoided it/them if you'd been in a situation where you could have seen one?
Does the fact that you avoid (feared object/s) mean that you can't do certain things that you'd like to do, or need to do?

(C) Panic attacks
Some people occasionally get feelings of anxiety or dread that are so strong that they simply have to do something to stop them, like running away. Have you felt like that in the past month?

IF YES: What did that anxiety or dread feel like?
For example did you get a thumping of the heart, or what?
How many of these attacks have you had in the past month?

Appendix 2

Dependency Score
This is derived from the 13 items listed below, each scored as follows:

(a) On your own without difficulty	0
(b) On your own with difficulty	1
(c) Only with help	2
(d) not at all	3

(1) Can you go out of doors?
(2) Can you use public transport?
(3) Can you go shopping for food or clothes?
(4) Can you cook a main meal?
(5) Can you wash clothes?
(6) Can you clean windows inside?
(7) Can you deal with any medicines or tablets that you might have to take?
(8) Can you handle your own money or finances?
(9) Can you feed yourself?
(10) Can you dress and undress yourself?
(11) Can you get in and out of bed?
(12) Can you have a bath or shower?
(13) Can you get around the house/flat?

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