

# Schizophrenia and Delusional Disorder in Older Age: Community Prevalence, Incidence, Comorbidity, and Outcome

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## Abstract

The opportunity to assess prevalence, incidence, and outcome of schizophrenia and delusional disorder was provided by an age- and sex-stratified random sample of 5,222 persons age 65 years and over. This sample was chosen from general practitioner lists, and interviewed by psychiatric nurses trained to use the Geriatric Mental State (GMS)-AGECAT computerized diagnostic system. GMS-AGECAT ensured the reliability of the selection of cases between the two waves of the study. A subsample was interviewed by a research psychiatrist. The sample was followed up 2 years later using the same method by interviewers blind to the initial findings. The protocols of all nominated cases and subcases of schizophrenia/paranoid disorder diagnosed by AGEKAT were reviewed by a clinician and *DSM-III-R* diagnoses were made. Refusal rate was 13 percent for initial interviews (wave 1) and 15 percent for reinterview 2 years later (wave 2). The prevalence of *DSM-III-R* schizophrenia was 0.12 percent (95% confidence interval [CI] 0.04-0.25) and delusional disorder 0.04 percent (95% CI 0.00-0.14). The minimum incidence of schizophrenia for new cases was 3.0 (95% CI 0.00 to 110.70); for new and relapsed cases, 45.0 (95% CI 3.54-186.20); and for delusional disorder, 15.6 (95% CI 0.02-135.10) per 100,000 per year. Two of the five cases with schizophrenia were known to have been first diagnosed before age 65. After 2 years, none of the cases of schizophrenia had recovered fully, but none was deluded at followup. Two had developed dementia. The outcome was bad because they remained cases of some type of psychiatric illness but good because of the improvement in their schizophrenia/delusion disorder symptoms.

**Key words:** Delusional disorder, comorbidity, incidence, prevalence.

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It has been difficult to estimate the prevalence and incidence of schizophrenia and delusional disorder in population samples because they are rare disorders. This is particularly true in older age groups. However, a random sample of 5,222 subjects, aged 65 and over, recently assessed as part of the Medical Research Council (United Kingdom)-Ageing in Liverpool Project-Health Aspects (MRC-ALPHA) study in Liverpool (part of the MRC Cognitive Function and Ageing Study [CFAS]), has allowed us to derive minimum figures for these diseases.

In older studies using community-based samples, prevalence figures for schizophrenia and delusional disorders in those aged 65 and over have varied within a narrow range, from 1.7 percent for late paraphrenia (Parsons 1964) to 4 percent (Christenson and Blazer 1984) for subjects showing pervasive persecutory delusions. Recent studies, including the Epidemiologic Catchment Area studies, reported a prevalence of 0.2 percent for schizophrenia (Keith et al. 1989), while a Danish study (Nielsen and Nielsen 1989) gave a 6-month prevalence rate for schizophrenia ranging from 0.4 to 0.6 percent. Kua (1992) used the GMS-AGEKAT criteria to examine a sample of 612 community-based Chinese subjects in Singapore, aged 65 and over, and found 0.5 percent schizophrenia/paranoid cases. Yet when Copeland et al. (1992) used the same methodology on a sample of 1,070 subjects in Liverpool, they recorded 0.1 percent prevalence (0.3% for the survivors of their sample 3 years later).

Kay (1972) took the 1966 official statistics for England and Wales and calculated an annual incidence rate for late-onset schizophrenia of 10-15 for males and 20-25 for females per 100,000 of the population aged 65 and over. Castle and Murray (1993) took a catchment area sample of subjects in touch with the Camberwell case reg-

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ister and found an annual incidence rate for schizophrenia in this age group, defined by *DSM-III-R* (American Psychiatric Association 1987) criteria, of 12.6 per 100,000 of the population aged 65 and over. Could it be that changing diagnostic criteria have led to lower prevalence and incidence estimates?

## Methods

**Sample and Interviewing Procedure.** The MRC-ALPHA study drew an age- and sex-stratified random sample from general practitioners' (GP) lists of 5,222 subjects 65 years and over living in Liverpool (United Kingdom) (wave 1 or prevalence wave). Two years later the survivors of that sample, 3,519 subjects, were reinterviewed (wave 2 or incidence wave) using the same measures and procedures, by interviewers who as far as possible were unaware of the original findings. Two years after wave 2, the survivors of those subjects who had been diagnosed as suffering from schizophrenia or delusional disorder at either the prevalence or incidence waves were followed up using the same measures to assess outcome.

General practitioners' lists include approximately 97 percent of the population of persons 65 and over, living in their own homes, in nursing homes, and in other residential accommodations. They exclude only the homeless and those subjects who have been in a hospital continuously for more than 2 years. Because the area mental hospital closed shortly after the study started and the majority of its long-stay patients had been discharged to community group homes under general practitioner care, it is likely that most patients with long-standing chronic schizophrenia were represented in the sample. The original intention of the study was to estimate the age-related incidence rates for the dementias; therefore, the project aimed to achieve a sample with 500 male and 500 female subjects in each half decade of age from 65–90 and for 90 years and above. The method is fully described by Saunders et al. (1993).

Each member of the sample was interviewed using (1) the Geriatric Mental State—community version (GMS A; Copeland et al. 1987), (2) the Mini-Mental State Examination (MMSE; Folstein et al. 1975) and were scored out of a possible 30 points, and (3) an additional schedule for demographic data.

Subjects nominated as cases of organic disorder and additional samples of other cases and subcases (in practice often including those diagnosed as having schizophrenia/paranoid states because they were identified as unusual) were reexamined by a research psychiatrist employed full time by the study, with some additional

help from psychiatrists-in-training, who administered the GMS B (concentrating on organic, depressive, and anxiety disorders), the History and Aetiology Schedule (HAS 3; Copeland et al. 1987) to an informant, and other interviews. After the interview the rater, whether initial interviewer or research psychiatrist, wrote a longhand summary of the case.

Interviewers for the full sample included nurses with psychiatric training who underwent the recommended GMS A training program and demonstrated satisfactory interrater reliability. The interview was administered from a laptop computer in the subject's own home, which greatly simplified the procedure and reduced user and transcriber errors. It also allowed for a number of built-in data quality controls.

**Measures and Diagnosis.** In this study we use both GMS-AGECAT and *DSM-III-R* criteria for diagnosis. The GMS-AGECAT is a computerized diagnostic method developed especially to study the mental disorders of older age where a reliable diagnosis is required for comparing levels of disease in different geographical areas and between different waves of longitudinal studies.

The GMS is a comprehensive semistructured mental state examination designed specifically for use with older people. The original version was developed from the Present State Examination (Wing et al. 1974) and Present Status Schedule (Spitzer et al. 1970) with the addition of 200 items, including those covering organic states (Copeland et al. 1976; Gurland et al. 1976). Later, the full interview was shortened using the results of a series of discriminant function analyses that identified items that distinguished normal subjects from those with mental illness, and those with depression from those with organic disorders (Copeland et al. 1987). Nevertheless, a substantial "paranoid section" was also introduced to encourage the subject to talk about his or her problems by having the interviewer deliberately adopt an emotionally neutral position. Delusional symptoms are distinguished and the subject's emotional reaction to them recorded. However, the interview did not cover all the possible types of delusions associated with schizophrenia; doing so would have made the interview unacceptably long. Nevertheless, broad subject areas were covered.

AGECAT is a computerized diagnostic algorithm (Copeland et al. 1986; Dewey and Copeland 1986) that, in the first stage, uses scores on GMS items to produce levels of "diagnostic confidence" on each of eight diagnostic syndrome clusters including organic; schizophrenia and related paranoid states; depression (depressive psychosis DP, depressive neurosis DN, and an approximation of

major depression and dysthymia without the 2-year rule); mania; and obsessional, hypochondriacal, phobic, and anxiety neuroses. Each subject is ranked by AGE-CAT at a level of diagnostic confidence ranging from 0–5 or 0–4 on each of the eight syndrome clusters. Associated levels on other clusters record comorbid conditions. Psychiatrists have been shown to select level 3 and above on any cluster as nominating “syndrome cases” for “intervention.” Levels 1 and 2 are termed as “syndrome subcase” levels.

In the next step of the program, AGE-CAT takes the confidence levels and compares them one against the other according to the hierarchy of disease listed above to determine an overall differential diagnosis of the first stage. Cases at levels 3 and above at this stage are referred to as “diagnostic cases” and at levels 1 and 2 as “diagnostic subcases.” A number of studies have now been completed comparing AGE-CAT stage 1 diagnosis with psychiatrists’ diagnoses of the same subjects. The agreement is satisfactory for depression and dementia even when trained, nonmedically qualified staff administer the GMS (Copeland et al. 1988). Ames et al. (1994) recorded a kappa value of 0.78 for agreement between AGE-CAT diagnosis and psychiatrists using *DSM-III-R* criteria.

**AGE-CAT as a Screening Device for *DSM-III-R* Schizophrenia and Delusional Disorder.** There is also some evidence that AGE-CAT diagnosis is satisfactory for schizophrenia/paranoid cases when the interviewing is undertaken by psychiatrists (Kua 1992). However, because the initial interviews in this study were not given by psychiatrists, we have used the AGE-CAT diagnosis only to select subjects for psychiatric diagnostic review and to determine subcase levels and comorbidity.

AGE-CAT nominates all subjects who have first-rank symptoms and delusions and hallucinations that are mood-incongruent for case level, unless they stand alone with no other symptoms of schizophrenia. In this case they are regarded as probable errors, but are flagged as unusual and can thus be examined separately. If a high case level of a mood disorder is also present, it is recorded as a comorbid state. AGE-CAT will not make an unqualified diagnosis of a mood state in the presence of mood-incongruent delusions or hallucinations. Similarly, it will not make the diagnosis of schizophrenia in the presence of case levels 4 and 5 on the organic cluster. In these instances the recorded levels on the schizophrenia cluster will be reported so that such cases can be reviewed if necessary. Combinations of symptoms indicating negative, residual, and catatonic symptoms can occasionally reach case level 3 on the schizophrenia cluster without delusions or hallucinations being present.

Finally a diagnosis was made by the research psychiatrist according to *DSM-III-R* criteria. The diagnosis is based on all the evidence available for each individual at case level, including the handwritten summaries of GMS and HAS, the AGE-CAT diagnosis and comorbid levels, a list of symptoms present for each subject (rated as mild or severe), and the outcome of the research psychiatrist’s reexamination (where available).

It was thought that the trained nonmedical raters would not be able to distinguish incoherence and marked loosening of associations, catatonic and stereotyped movements, and loss of emotional expression from a range of normal behavior, nor could they distinguish the facial and somatic signs of dementia from Parkinson’s disease. It was also thought that the distinction between hallucinations of touch, taste, and smell would prove difficult. For the sake of screening for cases of schizophrenia and paranoid states, these symptoms were nevertheless left in the algorithm and cases that did not fulfill *DSM-III-R* criteria were eliminated on review.

AGE-CAT imposes no time criterion on the length of illness at this stage, so it is likely to be more generous than *DSM-III-R* in the nomination of cases.

## Results

The estimated eligible population was 69,960 subjects, aged 65 years and over. The initial interview response rate for the first wave of the study is described in detail in Saunders et al. (1993). Of the available age-stratified random sample of 6,035 subjects, 5,222 (87%) were interviewed; 13 percent refused. Table 1 shows the response rate 2 years later for the followup (wave 2) when 15 percent of the sample refused reinterview. Prevalence and incidence figures are adjusted to take into account the appropriate weight for each subject based on the age and sex stratification of the sample.

**Table 1. MRC-ALPHA: Wave 2 (followup) patients aged  $\geq$  65 living in Liverpool**

Subject status	Number (%)
Eligible for followup	5,222
Deceased	990
Moved	50
Cannot be contacted/missing	42
Available	4,140
Refused interview	621 (15)
Interviewed	3,519 (85)

*Note.*—MRC-ALPHA = Medical Research Council—Ageing in Liverpool Project—Health Aspects, which is part of the Cognitive Function and Ageing Study in the United Kingdom.

Two years after initial interview, 3,519 subjects were followed up. A similar proportion refused interview as did on the first occasion; the rest had died, moved, or could not be contacted (see table 1). The same prevalence and incidence cases who were still available for interview were followed up 4 years after the initial interview.

**AGECAT Diagnostic Cases and Subcases of Schizophrenia/Paranoid Disorder.** Applying the results of the community version of the schedule GMS A given by trained nonmedical raters, AGECAT identified 12 diagnostic cases of schizophrenia/paranoid disorder out of 5,222 subjects, 0.24 percent (95% confidence interval [CI] 0.13–0.42): 10 at level 3 and 2 at level 4; and 39 subcases, 0.74 percent (95% CI 0.52–1.01): 29 at level 1 and 10 at level 2.

**Cases of DSM-III-R Schizophrenia and Delusional Disorder.** On review, four of the diagnostic subjects were rejected. Three had achieved case level 3 mainly on the presence of incoherence of speech, catatonic movements, and flatness of affect but without expressing delusions or hallucinations. Their summaries indicated that they were very unlikely to have had schizophrenia or a paranoid disorder. They appeared instead to have had aphasia, a number of repetitive movements due to agitation, or Parkinson's disease. The other subject was rejected because, although she had described resented visual hallucinations and had called the police, she had been previously diagnosed as having Parkinson's disease,

had suffered numerous falls, and her hallucinations had started after she received new medication from her doctor and had stopped when the medication was withdrawn. She also had early memory loss. A clinical diagnosis of Lewy body dementia was made.

Of the remaining eight diagnostic cases, five subjects had received, in addition to the standard first interviews, a full set of interviews from the research psychiatrist.

### Schizophrenia Findings.

**Prevalence.** After examination of all the evidence, five of the remaining eight diagnostic cases were identified as fulfilling *DSM-III-R* criteria for schizophrenia (0.12% of the original sample; 95% CI 0.04–0.25) (see table 2). One was a paranoid woman aged 74 (MMSE score 24) who complained that two men living next door to her caused severe tingling pains in her back by scraping their boots on the floor. She could hear them talking continuously but could not hear what they said. In fact, there was a woman living alone next door. The subject had been admitted to the hospital 2 years earlier with a diagnosis of paranoid schizophrenia.

The second case, also an AGECAT subcase organic at level 2, was a woman aged 88 (MMSE score 18) who complained frequently that a person was trying to reach her on the telephone. At times, she said it was her daughter and at other times that it was an imposter trying to trick her and "make money out of the situation." She also said she had seen visions but would not elaborate on

**Table 2. MRC-ALPHA: Prevalence and Incidence of schizophrenia and delusional disorder**

Prevalence (5,222 subjects)	<i>n</i>	%	95% CI
AGECAT diagnosis			
Schizophrenia/paranoid disorder			
Diagnostic cases	12	0.24	0.13–0.42
Diagnostic subcases	39	0.74	0.52–1.01
<i>DSM-III-R</i> diagnosis	5	0.12	0.04–0.25
Schizophrenia	3	0.04	0.00–0.14
Delusional disorder			
	<i>n</i>	Persons per 100,000	95% CI
<b>Incidence (3,519 subjects)</b>			
<i>DSM-III-R</i>			
Schizophrenia new case			
Provisional diagnosis	1	3.0	0.00–110.70
Previous episodes (relapsed)	2		
All incidence cases (including relapses)	3	45.0	3.54–186.20
Delusional disorder	2	15.6	0.02–135.10

*Note.*—MRC-ALPHA = Medical Research Council—Ageing in Liverpool Project—Health Aspects, which is part of the Cognitive Function and Ageing Study in the United Kingdom; CI = confidence interval; *DSM-III-R* = *Diagnostic and Statistical Manual of Mental Disorders—Revised* (American Psychiatric Association 1987); AGECAT is a computerized diagnostic system.

these. Her brother had committed suicide and her daughter had been diagnosed with schizophrenia.

The other three subjects were cases of chronic schizophrenia. One was a woman aged 83 (MMSE score 19) who believed that magnetic forces were being used to throw her to the ground, that she was a royal person, and that the "devil's people" talked to her, threatening and persecuting her. She answered them aloud several times during the interview. The other two were women, ages 70 and 84, who had been discharged in recent years from mental hospital care to a hostel. They had diagnoses of schizophrenia of many years standing, predating their 65th birthday. The younger one, who complained she saw visions and heard voices, had little facial expression and recent onset of memory loss (MMSE score 15); comorbid dementia was diagnosed. The other was absorbed in playing with dolls whom she called her children, carried two shopping bags of paper rubbish, and was disheveled and talked constantly to herself. Her speech was audible but unintelligible. (She ignored the MMSE.)

**Outcome after 2 and 4 years.** Three of the prevalence cases of schizophrenia (two chronic and one paranoid) had become diagnostic cases of depression, 2 years later at first followup. At year 4 (second followup) one was a subcase of phobic disorder, one a severe case of mania, and one had developed dementia. Two had developed an organic state (dementia) at year 2, which was confirmed for one at year 4 (the other had died). At year 2 none reached case level on the schizophrenia/paranoid cluster anymore, although two subjects scored level 2 (one was still level 2 at year 4 but by then had become demented; the other was manic). The other three had become level 0 by year 4 (table 3).

**Incidence.** At the 2-year followup, two cases were identified who had been diagnosed with schizophrenia after hospital admission 8 and 18 years previously, and who had apparently been in remission when seen on the first occasion. Both now fulfilled the criteria for schizophrenia. One man aged 69 (MMSE score 29) complained of, among other things, pain in his back caused by an injection of a radioactive substance administered by a Newfoundland fisherman. The other, a woman aged 67 (MMSE score 23), named a well-known Middle Eastern president who talked to her frequently. She complained that this had started again after a change in medication. Thus, there are two known relapses of schizophrenia in the intervening 2 years between interviews. At year 4 followup, the first subject was alive but could not be contacted; the second was diagnosed by AGE-CAT as having only mild depression.

There was one new case of provisional schizophreniform disorder, a man aged 86 (MMSE score 24) who had

**Table 3. MRC-ALPHA: Outcome of prevalence for schizophrenia and delusional disorder**

Age	AGECAT levels (0-5) Year 0			Year 2			AGECAT diagnosis Year 2			AGECAT levels (0-5) Year 4 (followup)			AGECAT diagnosis Year 4		
	Organic	S/P	Depression	Organic	S/P	Depression	Organic	S/P	Depression	Organic	S/P	Depression	Mania	Mania	
Diagnosis DSM-III-R schizophrenia															
74	0	3	0	0	0	DN3	DN	DN	0	0	0	0	0	0	Phobia (subcase)
83	0	3	DP3	0	2	DP3	DP	DP	0	0	0	0	5	Mania	
70	1	3	0	3	2	DP4	DP	DP	5	2	0	0	0	Dem	
84	3	4	0	4	0	0	Dem	Deceased	3	0	DN3	0	0	Dem	
88	2	3	DP4	4	0	0	Dem	Dem	3	0	DN3	0	0	Dem	
Diagnosis DSM-III-R delusional disorder															
90	2	3	DN4	1	2	DN3	DN	DN	3	0	DP4	0	0	DP	
74	2	3	DP3	Not reinterviewed			—	—	Refused reinterview			—	—	—	
87	0	3	DP4	0	3	D1	S/P	S/P	Deceased			—	—	—	

*Note.*—Subjects ages 74, 83, 70, and 84 (diagnosis schizophrenia) were known to have several years' history and subjects ages 74, 70, and 84 (diagnosis schizophrenia) were known to have had prior admissions to a hospital for schizophrenia. MRC-ALPHA = Medical Research Council-Aging in Liverpool Project-Health Aspects, which is part of the Cognitive Function and Ageing Study in the United Kingdom; AGE-CAT is a computerized diagnostic system; S/P = schizophrenia/paranoid; DN = depressive neurosis (DN3 and 4 = case levels); DP = depressive psychosis (DP3 and 4 = case levels); Dem = dementia; D1 = subcase of depression level 1 (case level = 3).

begun to hear the voices of relatives and occasionally see them when they were not there. He would go to the door in the belief they were waiting to come into his home. The time between onset of symptoms and interview had been less than 6 months. He had mild memory loss but there was no other sign of organic disorder and he was rated by AGE-CAT as organic level 0. However, the subject had been bereaved after loss of a close relative (not his spouse) in the 6 months before interview and had subcase depression level 2. His symptoms seemed out of proportion to the level of depression, but the possibility that they were associated with bereavement cannot be ignored. If this sole new case that otherwise fulfilled the *DSM-III-R* criteria (except that symptoms had not been present for a full 6 months) were accepted, it would provide an annual incidence figure of 3.0 per 100,000 (95% CI 0.00–110.70) persons per year. At year 4 followup (2 years later), he achieved a diagnosis of dementia at the highest AGE-CAT organic level.

Taking all three incidence cases together, the annual incidence figure is 45.0 per 100,000 (95% CI 3.54–186.20) persons per year.

#### Delusional Disorder Findings.

**Prevalence.** The remaining three diagnostic cases identified at the first interview suffered from delusional disorder, giving a prevalence figure of 0.04 percent (95% CI 0.00–0.14). One, a man aged 90 (MMSE score 28), had somatic-type delusions, complaining constantly and angrily that painful stitches smelling of resin had been left in a scar on his head after treatment he had received 32 years previously. A woman aged 74 (MMSE score 26) complained angrily that a named terrorist organization had installed video cameras in her house to keep watch on her. She lived behind closed curtains. The third was a man aged 87 (MMSE score 28) who spoke of delusions involving touch and of auditory hallucinations that he resented but would not reveal their content.

One case of delusional disorder was found at 2-year followup, who had almost certainly concealed the extent of his symptoms at the first interview. He was 83 years of age (MMSE score 19) and wholly absorbed in religious thoughts that so preoccupied him that he ignored the interview. He talked constantly of “doing the Lord’s work” and cited “little miracles” his faith had brought about. He talked of his special talents, how God controlled his thinking and read his thoughts. The interviewers, while having no doubts that much of this discourse was pathological, had difficulty distinguishing it from religious experience. The subject showed some manic symptoms, although not sufficient for a diagnosis of mania, during both initial and followup interviews. The

first-year interviewer was inclined to accept this man as an overzealous religious person, while the interviewer 2 years later regarded the thinking as delusional with evidence of thought interference and delusional thought reading. We accept this man as having delusional disorder rather than schizophrenia or schizoaffective disorder. At year 2 outcome, he scored level 5 on the schizophrenia/paranoid cluster but by year 4 followup he had become an AGE-CAT subcase of anxiety at level 2. We do not include him among the prevalence cases because we were not able to reevaluate cases at year 0 that were not cases at year 2 in a similar manner.

**Outcome after 2 years.** One prevalence case of delusional disorder was not followed up at years 2 or 4. Another, the subject who would not reveal the content of his auditory hallucination, remained at case level 3 at 2-year followup but had died by year 4. The third, the man complaining of painful stitches in a scar, is recorded as a diagnostic case of depression with subcase paranoid symptoms at level 2 at year 2, indicating that the symptoms were no longer delusional. At year 4 the depression had become worse and the paranoid symptoms resolved (table 3).

**Incidence.** A new case of delusional disorder was found, a man aged 83 (MMSE score 26, some parts incomplete due to blindness) who had delusions of persecution. He described the woman living below him as a “witch,” but he said that he had a constant, “spirit guide” with whom he talked (table 4). Taken together with the case mentioned earlier who was identified at wave 2, the annual incidence of delusional disorder is 15.6 per 100,000 (95% CI 0.02–135.10) persons per year. The first case was alive at year 4 followup but refused interview. No cases of schizoaffective or paranoid disorder (not otherwise specified) were found.

#### Comorbidity.

**Diagnostic schizophrenia or delusional disorder comorbid with organic or depression levels.** Of the eight diagnostic cases with *DSM-III-R* diagnosis of schizophrenia or delusional disorder, one had a comorbid organic case level, but the paranoid symptoms dominated the clinical picture, and four had comorbid depression case levels (three psychotic type), but the delusions were not mood congruent.

**Diagnostic organic cases comorbid with schizophrenia/paranoid type.** Of those subjects in the total sample diagnosed by AGE-CAT as diagnostic cases of organic disorder ( $n = 444$ ), four (0.90%) also had comorbid schizophrenia/paranoid case levels but on inspection only two (0.45%) of these had clear paranoid delusions, a proportion rather lower than hospital-based studies would suggest.

Table 4. MRC-ALPHA: Outcome of incidence for schizophrenia and delusional disorder

Organic	AGECAT level (0-5) Year 2			AGECAT level (0-5) Year 4 (followup)			AGECAT diagnosis
	Schizophrenia	Depression	AGECAT diagnosis	Schizophrenia	Depression	AGECAT diagnosis	
Schizophrenia							
0	3	0	S/P	Cannot be contacted			
0	5	DN3	S/P	0	DN3	DN	
2	3	D2	S/P	5	DP3	Dementia	
Delusional disorders							
0	5	D2	S/P	0	0	Anxiety (subcase)	
1	3	D2	S/P	Cannot be contacted			

Note.—MRC-ALPHA = Medical Research Council—Ageing in Liverpool Project—Health Aspects, which is part of the Cognitive Function and Ageing Study in the United Kingdom; AGECAT is a computerized diagnostic system; S/P = schizophrenia/paranoid, DP = depressive psychosis (DP3 = case level); DN = depressive neurosis (DN3 = case level); D2 = subcase of depression level 2 (case level = 3).

**Diagnostic depression cases comorbid with schizophrenia/paranoid type.** Of 482 AGECAT diagnostic cases of depression (diagnostic CI level 3 and above), only 1 (0.21%) such case was recorded as having comorbid schizophrenia/paranoid at case level. This subject had auditory and visual hallucinations (both mood incongruent and mood congruent) and delusions of persecution (mood incongruent). The finding of only one such case is not surprising because such cases are usually diagnosed by AGECAT as mood incongruent paranoid states. In this instance, the presence of mood congruent delusions and level 4 psychotic depression determined a final depression diagnosis. At followup examination 2 years later, the levels had hardly changed except that the subject had, in addition, moved to comorbid organic level 4 while retaining an overall diagnosis of severe psychotic depression.

Of all 333 AGECAT depressive neuroses diagnostic cases (close to *DSM-III-R* dysthymic mood without the 2-year time restriction), 20 (6.0%) were associated with subcase levels of schizophrenia/paranoid (paranoid ideas and ideas of reference not delusional) compared with 48 (32.2%) of 149 cases of depressive psychosis (difference 26.2%, 95% CI 18.3–34.1 for the difference;  $p < 0.0001$ ).

## Discussion

The response rate of the sample was reasonably high at 87 and 85 percent for waves 1 and 2, respectively. Although this was a study principally concerned with the prevalence and incidence of dementia and depression, paranoid behavior, delusions, and hallucinations were carefully included in the questioning and observational items indicating negative symptoms of schizophrenia were recorded.

One of the problems of studying paranoid illness in the community is that subjects have usually learned to conceal their symptoms, having met with ridicule or hostility when they reveal them. The symptoms may also be “encapsulated” and not easy to elicit unless the content is specifically asked for. The GMS A attempts to overcome some of the subject’s reticence by suggesting that it is not necessarily unacceptable to dislike some member of his or her immediate community. It is not easy to validate this approach on a sufficient number of subjects without including those referred to a hospital, but subjects who have agreed to such referral may, in any case, be more amenable to requests to describe their illness. It is therefore unlikely that the method has identified all the potential cases, and so the results must be seen to represent minimum estimates.

AGECAT relies on the congruity of delusions and hallucinations associated with mood when making a differential diagnosis between affective disorders with psychotic symptoms and other psychotic disorders. *DSM-III-R* relies on the overlap in time of delusions and hallucinations with mood disorders and the relative duration of each. This is a difficult concept to operationalize for a computer unless the rater's judgment is reliable. It is possible that some cases with mood-congruent delusions and hallucinations in this study have been lost because the phenomena did not always coincide with mood disorder. Clinical impression would suggest such occasions are rare.

*DSM-III-R* criteria A1: c, d, and e (incoherence or marked loosening of associations, catatonic behavior, flat or grossly inappropriate affect) were not accepted at the diagnostic review unless supported. Thus, some subjects (maximum 3) with schizophrenia defined by these criteria alone may have been lost. However, the evidence was strong that these cases were in fact cases of early dementia, Parkinson's disease/Lewy body dementia, and aphasia.

Of the eight diagnostic cases identified by AGECAT as schizophrenia/paranoid, five had the benefit of reinterview by the research psychiatrists. The original summaries were available for all. However, it is possible that at least one subject could have been rejected by the diagnostic reviewer because the nurse interviewer had failed to record salient symptoms.

As in most epidemiological studies examining incidence, it was not possible to establish whether or not those subjects who died before the 2-year reinterview had developed a paranoid disorder before death.

Despite the problems mentioned above, the levels of illness found in this study were not unexpected, based on the findings of previous studies. The prevalence of both schizophrenia and delusional disorder are low and although the conditions were more common in women, this was not a significant finding. Comorbidity with dementia was not as high as hospital-based studies would suggest. The outcome of cases, however, is clearly poor. None of the five schizophrenia cases was a noncase of illness 2 years later, although three appeared to be in complete remission from schizophrenia and the remaining two were not deluded at the time of interview. The two subjects who developed dementia in 2 years may originally have been misdiagnosed; if so, the already low prevalence of schizophrenia is reduced further. Both subjects already had organic case levels at the first interview but their paranoid symptoms were dominant; the other three subjects had become cases of depression. Only one of the three delusional disorder cases had remained unchanged. Schizophrenia, or at least the symptoms, may

not be so overtly chronic at this age as is sometimes supposed.

If the prevalence of schizophrenia in younger age groups is approximately 1 percent, this level does not appear to be reflected at older ages. Is this because subjects with schizophrenia die at a comparatively younger age? Or do they recover sufficiently from their symptoms to make them difficult to detect in later life? Do they drop out of contact with the general practitioner's registers of patients? An unpublished followup of chronic mental hospital patients discharged to community care in Liverpool, England, when the hospital closed showed over 90 percent in contact with services 3 years later.

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