Assessing the Health Care Needs of the Aged

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A sample survey of the health care needs of the aged population of Monroe County, New York (including the city of Rochester), living at home and in health care institutions, was carried out largely by nurses, since pretests of interview methods and questionnaires showed that the important criterion in such an assessment was the degree of care or supervision needed, rather than medical diagnosis or symptomatology. Sampling problems in a survey of the aged are discussed, as well as the correlation of physical and mental disability among the aged with demographic and socioeconomic factors. Conclusions point to the misplacement of many aged persons in facilities providing a higher and more costly level of care than required and to the need for more congregate living and home care facilities.

It is widely recognized that the aged are more often ill or disabled than younger persons; that in general they have less income and are less well able to care for themselves; and that facilities for their care are often inadequate. The substantial problem presented by this situation is aggravated by the increasing proportion of aged persons in the general population, at the same time that changing cultural patterns are forcing the extrusion of aged members from the extended family.

The urgency of the need has brought the development, in recent years, of government programs aimed at improving the quality and availability of medical care for the aged. But the effectiveness of these programs has been diminished and their future imperiled by a lack of reliable data on the health care needs of aged persons. The National Health Survey [1] has reported disability days, hospital days, and office visits by age; Shanas [2] and others have described characteristics of aged persons at home; but until the study reported here, no survey in the United States covered an entire aged population, at home and in institutions.

Supported by a grant from the Ford Foundation supplemented by funds from the University of Rochester. Study cosponsored by the University of Rochester School of Medicine and Dentistry, the Health Council of Monroe County, Inc., and the Council of Social Agencies of Rochester and Monroe County, Inc.

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This article reports a study of the care needs of the aged population, living at home and in institutions, in the city of Rochester and surrounding Monroe County, New York, in the middle 1960s. The objectives—to assess the adequacy of existing care facilities for the aged and to develop a rational plan for future care—required answers to six questions:

1. What are the institutional health care needs of the aged population?
2. How appropriate is the care presently being provided?
3. What demographic characteristics are associated with disability and the need for care?
4. What changes are necessary to provide the most appropriate care within existing facilities?
5. What changes in the array of health care facilities would be necessary to provide optimal care in the future?
6. What resources are required to meet these needs?

Question 6 involved a cost study utilizing industrial engineering techniques; this will be reported in a separate article.

The Setting

The city of Rochester and surrounding Monroe County form a well-defined area with no other large cities nearby. In 1964 the area had a population of 625 018 persons in urban, suburban, and rural settings. It constituted a Standard Metropolitan Statistical Area, hence considerable demographic and other information was available on a county basis. Among its exceptional features are the high median income (Table 1). Health insurance plan enrollment is also notable: approximately 82 percent of the Monroe County population enrolled in a Blue Cross Plan in 1967, as against 33 percent nationwide.

The community has shown cooperation in other surveys of health care needs [3,4], and medical professionals and institutions have demonstrated re-

Table 1. Selected Population Characteristics for Monroe County Compared with National Census Data, 1960

Population characteristic	Monroe County	United States
65 and over, percent	10.7	9.2
Nonwhite, percent	4.2	11.4
Median age, years	32.1	29.2
Median income (families and unrelated individuals)	$6106	$5009
Median school years completed (persons 25 and over)	10.5	11.2
Living in same house in 1960 as in 1955 (persons 5 and over), percent	54.8	49.9

sponsible attitudes toward quality and costs of health care (98 percent of all surgical fees in 1967 were within the Blue Shield rate schedule). It has made excellent progress in community health care planning [5], with the public, the medical profession, and medical agencies and institutions developing effective working relationships.

In 1963 Monroe County had 3.4 general hospital beds, approximately 7.4 chronic disease beds (including mental hospital facilities), and about 1.8 domiciliary places per 1000 population, including those in homes for the aged (chronic disease beds, 0.7 per 1000; domiciliary places, 1.0 per 1000). The types of institutions providing inpatient or other residential care for aged persons, and the services they offered, were as follows:

General hospitals
  University medical center (685 beds)
  Four medium-size hospitals (250–450 beds)
  Two small hospitals (under 150 beds)

State mental hospital (Rochester State Hospital)

Monroe County Infirmary (Monroe Community Hospital). Cares for chronic disorders. Resident physicians; continuous nursing service; limited surgical, rehabilitative, radiological, and laboratory services; also includes a short-term psychiatric unit.

Nursing homes (36). Continuous nursing service.

Homes for the aged (8). Health-related services, continuous general supervision, direct personal care services in activities of daily living. Admission policy excludes those with mental impairment, but patients who develop mild mental impairment later are permitted to remain.

Monroe County Home. Continuous general supervision and communal meals. Medical care provided in contiguous County Infirmary.

Homes for adults. General supervision and some assistance in activities of daily living.

Boarding homes and foster homes. Private homes providing communal meals but no supervision.

A number of residential hotels, clubs, and Y's provided accommodations for essentially independent living.

In addition, personal health services in the home were provided by public health nurses, physical therapists, and other professionals through the Monroe County Health Department (74 373 nursing visits and 3 003 physical therapist visits in 1963) and the Visiting Nurse Service of Rochester and Monroe County (71 054 visits in 1963, including nursing, physical therapy, and such additional home services as visiting health aides, meals-on-wheels, and personal service bureau).

Coordinated home care, organized by the Home Care Association of Rochester and Monroe County, utilized the services of these and other agencies. In 1963 an average of 84 patients received such organized home care services on any one day, and the average duration of this care was 44 days. (By 1968 the average had risen to 137 patients per day, with an average duration of 38 days. The Blue Cross contract covered up to 200 home health care visits per year; the 1968 average was 28 visits per patient.) Substantial ambulatory services were also provided by a number of nonprofit agencies for disabled adults and children and in categorical areas such as cancer, heart disease, multiple sclerosis, and tuberculosis.

Design of the Study

The health care needs of persons 65 years of age and over were evaluated by interviewing samples of this age group living at home and in the institutions listed above, using a classification of care needs [6] developed from three pilot studies conducted by physicians and public health nurses. The samples of aged persons living at home and in residential facilities were interviewed by public health nurses; those in health care institutions (except general hospitals) were interviewed by public health nurses and physicians to determine the appropriateness of care. Their assessments were supplemented by a separate study of new admissions of aged persons to these institutions.

A cost study of the various levels of care for those persons found to be appropriately placed was made by industrial engineers and cost accountants. This cost analysis (to be reported separately) included extensive observations in general hospitals. From these observations a sample of aged patients in these hospitals was identified, to complete the estimate of health care needs of aged persons in institutions.

In addition to the data needed for classification according to health care needs, information on employment, education, household composition, income, insurance coverage, and other variables was obtained for the household and residential survey samples. Social class was estimated for these samples on the basis of education and income. For institutionalized patients, social class was estimated from the Wille–Wagenfeld composite index [7] on the basis of census tract information for place of residence before admission to the institution. The entire sample was thus rated on a scale from 1 (highest social class) to 5. The association of these parameters with care needs and disability was analyzed.

The Sample Population

For those 65 years of age and over living at home, an area probability sample was drawn, so that each person in this age group who was a member of the household population of Monroe County would have an equal chance of being selected. The area sample was stratified according to degree of

urbanization (city of Rochester; other places with population over 2500; and the remainder, or rural portion, of the county) and according to geographic density of population 65 years of age and over. Households and persons drawn for the sample were listed by field enumerators with the help of detailed instructions.[1] On the basis of 1960 census data, it was expected that the sample would contain 974 aged persons (1960 population 65 and over, 58 472) to be enumerated and interviewed over a ten-month period. The period was later reduced to six months, since repetitive findings made it apparent that a smaller sample, estimated at 575, would be adequate; but a total of only

Table 2. Study Sampling Rates, by Type of Institution

Type of institution	Total aged population	Sample population		Completed interviews	
		Number	Percent of total	Number	Percent of sample
Residential hotels and clubs, Y's, boarding homes, homes for adults	450	44	9.8	33	75
Nursing homes	1118	98	8.8	98	100
Homes for aged	1049	85	8.1	85	100
County Home	171	20	11.6	20	100
County Infirmary	379	38	10.0	38	100
State mental hospital	890	69	7.7	69	100
General hospitals	492*	492	100.0	492	100

*Represents total over extended survey periods. Total at any one time: 484.

397 were enumerated, as discussed below. Of these, interviews were completed with 349 (87.9 percent); 21 refused to be interviewed, and the remaining 27 could not be reached, had been admitted to institutions, provided only partial information, or had died.

The 21 who refused interviews differed from the rest of the sample in certain characteristics: 50 percent were 75 years of age and over, compared with 39 percent among those interviewed; two-thirds were living with husband or wife compared with two-fifths of the interviewed; and only 42 percent had attended high school and none had attended college, as against 68 percent high school and 23 percent college among the interviewed. No income information was available on the refusal group for comparison with the rest of the sample. It would appear, however, that the overall results would be modified

[1]Health Care of Aged Study. Part I, *A Study of the Physical and Mental Health Care Needs of Older People in Monroe County, New York.* Available from Department of Preventive Medicine, University of Rochester School of Medicine, 260 Crittenden Boulevard, Rochester, N.Y. 14620. 352 pp., $4.

only insignificantly if the best estimate of possible needs were made for the 48 persons not interviewed, on the basis of the incomplete information available about them.

For the aged who made their homes in residential clubs and hotels, boarding homes, and homes for adults, a 10 percent random sample was designed, yielding a total of 44; interviews were completed with 33 of these persons (75 percent). It must be recognized that information about such residential facilities is very limited, and it is probable that a number of them were not reached and included in the sample.

In the chronic care facilities, each bed occupied by a patient 65 or over was identified and assigned a number; the sample was then selected by the use of a table of random numbers. Sampling rates for these institutions ranged from 7.7 percent to 11.6 percent, since it was anticipated that most aged persons needing institutional care would be found in these institutions.

Table 3. Sampling Rates in Admissions Study

Type of institution	Admissions study population	Sample population	
		Number	Percent
All study institutions	1108	120	10.8
Home for the aged	136	17	12.5
Monroe County Infirmary	211	34	16.1
Rochester State Hospital	191	26	13.6
Nursing homes	570	43	7.5

A larger number of aged persons in general hospitals were studied during the survey periods for the cost study[1] than were in these short-term hospitals at any one time. The fact that the industrial engineering observations in the cost study were concentrated in a single section of a single hospital on a given day presented a situation similar to that resulting from the stratification scheme in the at-home survey, with the hospitals stratified in subsections of about 45 beds. The frequency of observation in the subsections of a given hospital, however, was made proportional to the number of aged patients discharged from that hospital in 1962.

Table 2 summarizes the sample population and completed interviews for the various categories of institutions.

In the course of interviewing patients in institutions for the care of chronic disorders, the difficulty of making retroactive judgments to the time of ad-

[1]Health Care of Aged Study. Part II, *An Analysis of Some of the Costs of Health Care for Older People in Monroe County, New York.* Available from Department of Preventive Medicine, University of Rochester School of Medicine, 260 Crittenden Boulevard, Rochester, N.Y. 14620. 132 pp., $2.

mission became apparent, since lengthening stays were associated with less likelihood of returning home and patients became adjusted to institutional life. An additional 120 patients were therefore studied at the time of their first admission to a chronic care institution (patients transferred from another chronic care facility were excluded). The units studied were the homes for the aged, the Monroe County Infirmary, the Rochester State Hospital, and the nursing homes. The Monroe County Home was excluded because only one elderly person was admitted during the period of observation. Samples comprising 7.5 percent to 16.1 percent of admissions were chosen at random from the list of admissions, as shown in Table 3, and interviews were completed for the entire sample over a 5-month period.

Sampling Problems

Sample Selection

The basic dilemma in selecting a population sample in a health care study is whether to choose a random sample, with a substantial number of subjects who refuse to participate or cannot be interviewed for other reasons, or a sample of persons known to individual physicians, hospitals, or agencies, whose cooperation is probable. Surveys of the latter design can be expected to yield a higher proportion of cooperating patients, but the bias inevitably associated with such surveys is difficult to assess. This study used a random sample of aged persons, in the belief that the bias resulting from nonparticipation would introduce less distortion than that associated with a nonrandom sample. Moreover, the institutionalized patients, who would be of greatest interest because of their evident care needs, could be expected to give essentially complete cooperation, so the disadvantages of the random sample were largely avoided in this group.

Underenumeration

In the sample of aged persons living at home, underenumeration—both of households and of aged persons—introduced a bias that cannot be estimated. The number of households enumerated was about 5 percent less than expected, with nearly all the underenumeration in the area outside the city of Rochester. This underenumeration of households was less of a problem than the underenumeration of persons 65 years and older. As indicated earlier, a total of 397 noninstitutionalized aged persons was enumerated, where approximately 575 were expected. In about 10 percent of the households information regarding aged persons was obtained from neighbors, but this can account for only part of the discrepancy.

Between 1960 and 1964 (when a special census of Monroe County was taken) there was a 2 percent decrease in the number of aged persons living in the county, in contrast to a 7.9 percent increase nationally. In the four-year period the total aged population dropped from 63 108 to 61 833, with a 9 per-

cent decrease in the city of Rochester (from 44 452 to 40 474) and a 13 percent increase in the rest of the county (from 18 656 to 21 359). These changes, again, can account for only a minor portion of the underenumeration. The conclusion appears inescapable that either persons admitting to age 65 or over in the census denied it in the survey enumeration or the presence of aged persons in households was denied by household members in the survey.

A general tendency to understate age would lead to an absolute deficit such as the survey found; but if this were the only basis for underenumeration,

Table 4. Distribution of Aged Population by Age Groups, Survey Household Sample and 1964 Census

Age group	Survey sample		1964 census, percent
	Number	Percent	
All	349	100.0	100.0
65–69	121	34.6	36.4
70–74	88	25.1	28.1
75–79	80	22.9	18.9
80–84	34	9.7	10.6
85 and over	19	5.1	5.6
Not ascertained	7	2.6	...

the average understatement of age would have to amount to almost five years to account for the 30 percent underenumeration. (About one-third of the population over 65 is in the 65–69 age group.) Furthermore, most aged persons are more likely to exaggerate than to understate age.

It is instructive to note the similarities in the proportions of the aged in each age group in this survey and in the special census of 1964 (Table 4). This result precludes the interpretation that it was especially those in the oldest of these age groups, expected to need more care, who were underenumerated because younger family members were reluctant to admit the presence in the family of an aged person who needed care and was not receiving it. When the sample was broken down by sex as well as age, larger discrepancies were noted compared with the census; but this probably reflects the greater variation inherent in smaller numbers, for the discrepancies were not significant by the chi-square test.

The difficulties encountered in this study in identifying an aged population living at home are not encountered where census data or registries provide lists of subjects. In a study of 3000 aged persons in Groningen, Van Zonneveld [8] selected the sample from a registry list. Chebotaryov and Sachuk [9] used census lists for a study of 21 000 U.S.S.R. citizens 80 years of age and older. The enumeration error in these circumstances is due almost

exclusively to death and migration and is very small if the census is of recent date. The emphasis on confidentiality of census information in the United States rules out this approach here.

In a study of persons who had had transient cerebral ischemic episodes, M. Henderson (personal communication) identified a sample population of aged persons (65 and over) in Baltimore. Of the number expected, only 85 percent were enumerated, the underenumeration being almost entirely among nonwhites. In the Rochester study only two nonwhites were enumerated, whereas five would have been expected. (In Monroe County in 1964, nonwhites made up 1.2 percent of the population 65 years of age and over.)

Exclusion of "Residents" Living Elsewhere

In conformity with 1960 census practice, the sampling scheme did not identify those Monroe County "residents" who were living outside the county, including retirees and institutionalized persons. The issues of retirees is a perplexing one. For health planning purposes the retiree belongs more to his retirement community than to his community of origin. On the other hand, it would be of great interest to identify a cohort of 65-year-olds and learn their health care needs in later years. Longitudinal studies are needed to clarify the issues of retirement migration and the care needs of a representative population. A disproprotionate number of aged Rochester residents may have migrated to other areas, in view of the unexpected decrease in the aged population in Rochester between 1960 and 1964.

Classification of Patient Care Needs

Development of Criteria

The health care needs of the aged population were appraised by nurses and physicians on the basis of responses to an interview questionnaire. The final questionnaire, stressing services and supervision needed by the patient rather than diagnostic criteria, was developed after three preliminary field trials.

In the first trial a random sample of 60 persons was selected from 212 living in two housing developments for the elderly, and 55 were interviewed by public health nurses. The provisional questionnaire was analogous to the National Health Survey, stressing symptomatology, but two questions on independence in ambulation were included. Of the 55 persons interviewed, 38 agreed to a physical examination by a physician.

As a result of this survey, one person was judged to need general hospital care (an unsuspected mass was found by the physician), one person was judged to need institutional nursing care (nursing care under general medical supervision), and eight persons were judged to need conventional home care (public health nursing service at home). Methodologically, the most significant result was the finding that the review of symptomatology contributed little to the estimate of needed health care; the useful observations turned out

to be the answers relating to ambulation. Furthermore, the physician's physical examination did not contribute significantly to the estimate of needed care, and in certain respects the public health nurses were likely to be better informed than the physicians regarding the care available in different settings.

The second trial attempted to assess the services and supervision needed by 25 persons living either at home or in the "well hall" of a home for the aged. In addition to specific questions regarding services needed (e.g., special diets, physical therapy, bowel and bladder management), the public health nurses conducting the interviews were asked to indicate the type of facility in which they judged the interviewee should receive care. Only one person was judged to require a type of care not being received—in that case, institutional nursing care. The results of this trial suggested that the appropriate basis for determining where an aged person should receive care is the type and amount of health care services he needs.

The third trial gave further support to the premise that public health nurses, because of their professional knowledge and experience, could make accurate and reliable judgments of the health care needs of aged persons, especially those living at home. A sample of 64 persons was identified from census districts, and 51 were interviewed by two nurses independently to determine the type of facility in which they might appropriately receive health care. Minor disagreements in 14 cases were readily reconciled, and the final decision was that three persons needed institutional care and eight needed conventional home care, the others needing no change.

Classification Categories

On the basis of the three field trials, a two-dimensional "patient service–patient need" classification was evolved [6, 10], with eight levels of physical care and five categories of supervision dependent on mental status. Physical care needs were classified as follows:

1. Acute medical care
2. Subacute medical care
3. Intensive nursing care
4. Institutional nursing care
5. Congregate living providing companionship and assistance in activities of daily living
6. Organized (team) home care (later dropped because of small numbers in this category)
7. Public health nursing at home
8. No physical care

Supervision indicated because of mental condition fell into the following categories:

1. Supervision in a closed psychiatric unit
2. Supervision in a short-term psychiatric unit

3. Continuous supervision under general psychiatric supervision
4. Intermittent supervision because of mild mental impairment such as forgetfulness or confusion
5. No supervision

From these categories a grid was constructed that provided a description of the care needed for each interview subject and permitted assignment of an appropriate placement for patients with any combination of physical and mental health problems.

Reliability of Assessments

In the survey of households and of residential facilities, public health nurses did the primary interviewing, calling on the help of an internist or psychiatrist if necessary. As indicated above, the pretests of the questionnaire gave evidence of the reliability of their judgments.

In the chronic care facilities nurses and physicians made independent judgments, then conferred and made a joint decision in case of disagreement. To check the reliability of these judgments, 51 of the 241 patients reviewed in these facilities were evaluated independently by a second nurse and physician team. The two estimates were in good agreement, with a coefficient of correlation above .95 on both physical and mental needs.

In the study of new admissions the nurse and physician members of the interviewing team recorded independent judgments on three points: the physical care being provided, the patient's need for supervision based on mental status, and the optimal placement, with a possibility of agreement or disagreement on each of the three points. In general, the nurse and the physician agreed, but among the 120 patients, representing 360 independent judgments, the nurse and physician disagreed a total of 35 times. In 13 of these cases the final team decision favored the nurse's original view and in 20 cases the physician's. In the remaining two cases the final judgment was different from either the nurse's or the physician's original judgment.

This would seem to indicate that the physician's judgment was more reliable, but there is also a possibility that the nurse gave in to the physician's judgment because of his more authoritative role. This latter interpretation is perhaps supported by the results of four cases in which independent "overlap" interviews were made by a second nurse–physician team. Three of these "overlap" interviews involved cases on which the first team had disagreed and the final decision had favored the physician's viewpoint. In three of these four cases the "overlap" team unanimously favored the nurse's judgment; in the fourth, the "overlap" team judgment was different from that of either nurse or physician. In the two cases mentioned in the preceding paragraph where the final team decision differed from both nurse and physician original judgments, the "overlap" team unanimously agreed with the final team judgment.

These sparse data would be consistent with the view that nurse and physician make different contributions to a more valid joint judgment, but they

are also consistent with an interpretation that nurses make such judgments about as reliably as physicians. Further studies are needed to clarify this important methodologic point.

In the Rochester State Hospital, reliability was tested in a similar manner, but because of a great variety of patient needs and scanty records, the entire sample was resurveyed, half by similar nurse and physician teams and half by psychiatrists. The correspondence with the first evaluation was very high (coefficients of correlation of .98 and .99).

In the general hospitals, independent estimates of health care needs were made by nurses and internists as part of the industrial engineering study reported separately.

Findings

Health Care Needs

Projection of the findings for the samples of aged persons at home and in institutions to the entire aged population indicated that 46 672 (75.5 percent) of the 61 832 aged persons in Monroe County needed neither physical care from a health service organization nor supervision because of impaired mental status; 8.6 percent needed physical care only, 8.8 percent needed supervision related to mental status, and 7.4 percent had both physical and mental care needs (Table 5, overleaf). These estimates were made without reference to care and supervision possibly being provided by household members. When this possibility was taken into account, it was found that 83.4 percent of the aged population could live at home without care from a health service organization and another 6.7 percent could live at home with public health nursing service, 5.9 percent required care in congregate living facilities, and 2.7 percent needed institutional nursing care. The remaining 1.3 percent needed various levels of more intensive medical or nursing care, with only 0.1 percent requiring inpatient psychiatric care (Table 6, p. 49).

Inappropriate Placements

In the general cross-sectional survey 40.9 percent of the sample and in the admissions study 47.1 percent were found to be inappropriately placed. The greatest misplacement was in the Rochester State Hospital, where in the general survey 94.4 percent of the aged patients and in the admissions survey 88.5 percent should have been placed elsewhere. The care needs of these misplaced patients could have been met in nursing homes or homes for the aged, except for the reluctance of these institutions to accept patients who need supervision because of mental impairment.

There was also considerable misplacement in other facilities, with most inappropriately placed patients receiving too high a level of care. In nursing homes 19 percent of all aged patients were inappropriately placed, in homes for the aged 14 percent, in the Monroe County Home 25 percent, in the

Table 5. Physical and Mental Care Needs of Monroe County Aged Population, 1964*

Physical care needs	All degrees		Degree of supervision indicated by assessed mental status					
	Number	Percent	No supervision	Intermittent supervision	Continuous supervision	Psychiatric unit, short-term	Psychiatric unit, long-term	Not ascertained
All physical needs	61 832	100.0	51 991	9 273	292	48	26	202
Acute medical care	502	0.8	357	82	22	16	...	25
Subacute medical care	34	0.1	22	11	1	...	...	...
Intensive nursing care	194	0.3	52	122	10	...	...	10
Institutional nursing care	1 725	2.8	657	843	185	26	13	1
Congregate living	2 460	4.0	1 423	960	62	...	13	2
Public health nursing at home	4 779	7.7	2 808	1 970	...	1	...	...
No physical care	52 138	84.3	46 672	2 808	12	5	...	164

8.6% Physical care needs only 8.8% Mental care needs only 7.4% Both physical and mental care needs

*Estimated without reference to possibility of care and supervision being provided by household members.

Table 6. Actual and Optimal Distribution of Monroe County Aged Population by Level of Care, 1964

Level of care	Number receiving this care				Number needing this care but not receiving it	Distribution with optimal placement*	
	Total	Percent	Appropriately	Inappropriately		Number	Percent
All levels	61 832	100.0	55 609	6 223	6 223	61 832	100.0
Acute medical care	484	0.8	451	33	23	474	0.8
Subacute medical care	50	0.1	30	20	4	34	0.1
Psychiatric inpatient care	897	1.4	59	838	31	90	0.1
Intensive nursing care	248	0.4	129	119	65	194	0.3
Institutional nursing care	1 642	2.6	1 303	339	383	1 686	2.7
Congregate living	965	1.6	784	181	2 853	3 637	5.9
Public health nursing service at home	1 477	2.4	1 313	164	2 808	4 121	6.7
No physical care from health service organization	56 069	90.7	51 540	4 529	56	51 596	83.4

*Estimated taking into account possible care and supervision provided by household members.

Monroe County Infirmary 37 percent, and in boarding homes and homes for adults 59 percent.

There was markedly greater misplacement in younger age groups. In nursing homes, the state mental hospital, the County Infirmary, the County Home, and homes for the aged, 67 percent of patients in the 65–69 age group were inappropriately placed, 50 percent of the 70–79 group, 30 percent of the 80–89 group, and 19 percent of the 90 and over group (significant at $P < .001$).

Within nursing homes the misplacement figures represented almost exclusively women receiving too high a level of care. In the study as a whole, however, a larger proportion of aged men than of women were misplaced, especially in younger age groups. All aged men in the state mental hospital were found to be at too high a level of care except for one who needed more intensive care, while some women in the younger age groups were appropriately placed there.

In relation to social class, placement was most likely to be appropriate in the highest class (75 percent), while appropriate placement for all classes combined was only 60 percent and for the two lowest classes (4 and 5) only 50 percent (differences significant at $P < .01$). In the state mental hospital, all patients in social classes 4 and 5 were misplaced, as were those transferred there from another institution (who were regarded in the survey as belonging to a special social class, rather than being rated according to previous place of residence).

Although the unmet needs of the sample of 349 aged persons living at home were modest, 17 who needed public health nursing services were not receiving such services and 11 who were living alone required supervision because of forgetfulness and confusion. The unmet needs increased with age and differed by sex: those of women were about equally divided between physical care and supervision for mild mental impairment, while men predominantly needed physical care. In the highest social class there were no unmet needs; in social class 2 the only need was for public health nursing. The unmet needs increased with decreasing social class, until in the lowest class more than a quarter of the aged persons living at home had unmet needs. These social class differences were more conspicuous when social class was estimated by census tract of residence than when based on education or income; the numbers were too small, however, to warrant applying statistical tests of significance.

Needed Array of Facilities

Appropriate placement of aged persons would require almost a fourfold increase—from 965 to 3637—in the number of places in congregate living facilities providing supervision for slight to moderate physical and mental problems and would permit a 90 percent reduction (from 897 to 90) in the number of beds in mental hospitals. Other changes would be minimal (Table 6), except for a nearly threefold increase—from 1477 to 4121—in the number

of persons receiving public health nursing services in the home. The net effect on the numbers living at home without care from a health service organization would be a decrease of nearly 8 percent, from 56 069 to 51 596; and the total number of persons living in their homes, with or without such services, would be reduced some 3 percent, from 57 546 to 55 717—a decrease attributable in part to the great loneliness and isolation of some of these persons but mostly to a need for supervision because of mental problems.

Factors Associated with Disability

The more important factors correlated with disability in the total sample of aged persons and in the sample population living at home (for whom additional socioeconomic data were available) are summarized in this section and the accompanying graphs.

In the total sample population, increasing age was the most conspicuous factor associated with disability (Fig. 1). Of those in the 65–69 age group, 92 percent were able to live independently (that is, without supervision for mental impairment and without physical care except public health nursing in some cases). This percentage declined sharply after 75 years of age, and by age 90 and over less than 20 percent could live independently. In the over-75 group, mental impairment was commoner than physical impairment. The need for institutional care showed a corresponding increase with advancing

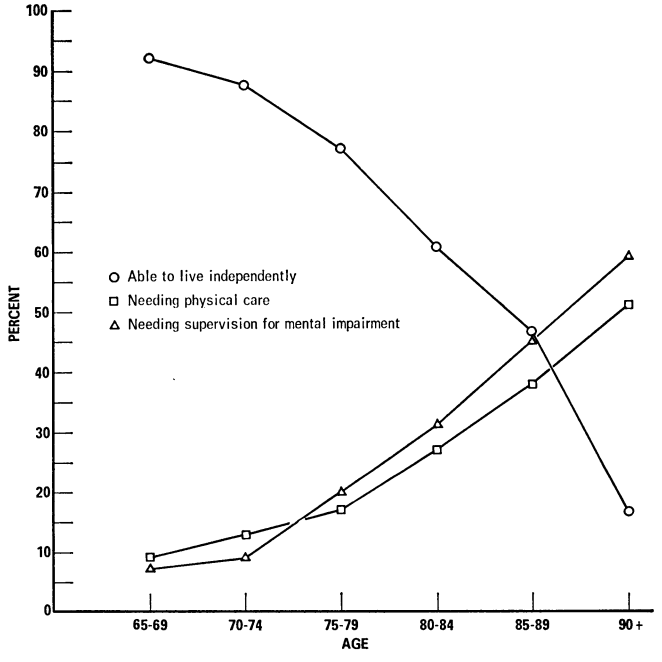

Fig. 1. Decrease in ability to live independently with increasing age, related to physical and mental care needs.

age (Fig. 2). Congregate living needs rose from 3.3 percent in the 65–69 age group to 14.3 percent in the 90+ age group; needs for institutional nursing care, which were minimal (0.4 percent) in the 65–69 age group, showed a sharp rise to 33.4 percent for the 90+ age group.

Ability to live independently showed sex differences also. More men than women were able to live independently (Fig. 3), and this appears to be related to a lower percentage of men with mild mental impairment up to the age of 85. After that age fewer women than men had such impairment, and more women than men were able to live independently.

Among patients in the chronic care facilities, 60 percent of men showed some mental incompetence as compared with 50 percent of women. This difference was entirely due to greater prevalence of confusion and forgetfulness (60 percent of men as compared with 48 percent of women). Only five persons in the sample, all women, were judged to be in need of care in a psychiatric unit.

Ability to live independently showed a marked decline with lower social class (Fig. 4), whether measured by income or by census tract of residence (Wille–Wagenfeld index). This decline proved to be largely due to impaired mental status; indeed, for those living at home, physical care needs showed little difference by social class, whereas supervision for mental impairment was needed for 25–30 percent of persons with incomes below $2000 compared with 10 percent or less of those with higher incomes. When social class was estimated on the Wille–Wagenfeld scale for the total population at home and in institutions, physical care needs were found to vary little by class except for a sharply increased need in the lowest social class, 33 percent of

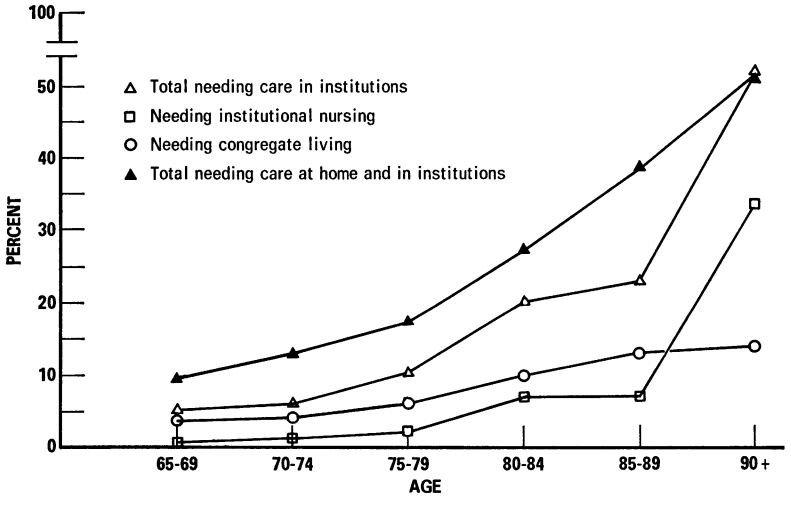

Fig. 2. Institutional and home care needs of aged population, by age groups.

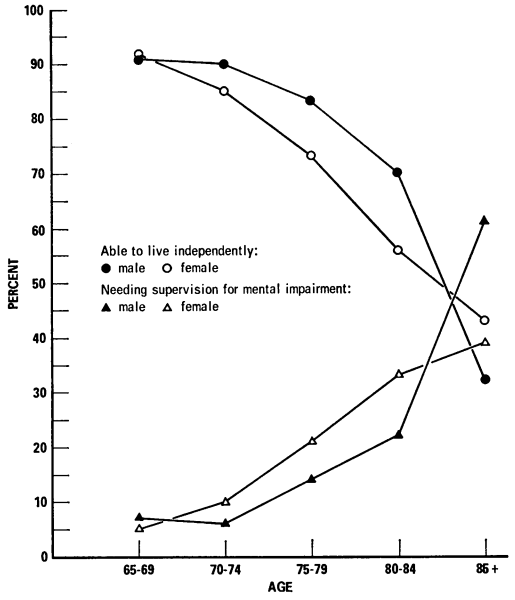

Fig. 3. Decrease in ability to live independently with increasing age, related to mental impairment, by sex.

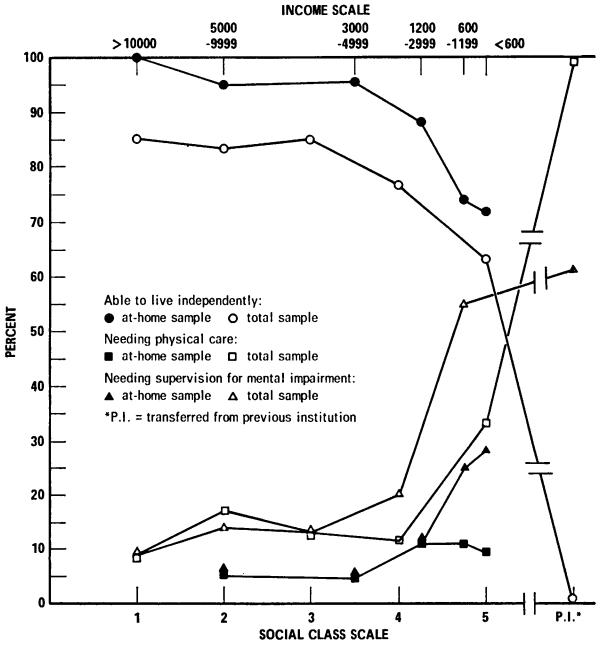

Fig. 4. Decrease in ability to live independently with decreasing social class and income, related to physical and mental care needs.

whom needed physical care compared with 10–17 percent in other classes. Mental impairment was more evidently related to social class for the total aged population than for the group living at home: from an average prevalence of 10–15 percent in social classes 1, 2, and 3, it rose to 20 percent in class 4 and to 55 percent in class 5. Of the institutionalized patients transferred from another institution, all had physical care needs and 60 percent were mentally impaired.

For the subsample of aged persons living at home, sex differences were slight and not significant: 88 percent of men and 85 percent of women were able to live independently. The additional data available for this group showed that low income was significantly ($P < .01$) associated with disability, especially mental impairment (Fig. 4). The relation of education to disability was less clear-cut: 80 percent of aged persons with less than a fourth-grade education were able to live independently, compared with 93 percent of those with a college education. This difference did not quite reach a significance level of $P = .05$.

Household composition was significantly ($P < .01$) related to ability to live independently. Among aged persons living with a spouse, 93 percent would have been able to live alone appropriately, whereas only 83 percent of those actually living alone—13 percent of whom were mentally impaired—were judged to be doing so appropriately. Those living with friends or relatives were least able to live independently, almost entirely because of mental impairment. There was no clear association of disability with number of persons in the household, except that there appeared to be substantially less mental impairment of aged persons in households with four or more persons.

In the sample population living at home there were 25 employed persons, all less than 80 years of age; 15 were male and 10 female. They were slightly better educated than those not working, had a somewhat better income, and were more likely to be living either alone or with a spouse than were others.

Length of Stay

In regard to patients judged to need a higher level of care, a difference was noted between the proportions found in the admissions study and in the general cross-sectional survey (Table 7). This difference could be entirely explained by the difference in length of stay for each category of care, if no patient went from one category to another.

The average length of stay for patients in any category (age, sex, care need, etc.) can be estimated by dividing the number of patients in that category found in a cross-sectional survey (prevalence) by the number of patients in that category admitted during a unit period of time (incidence). For example, if 939 beds in chronic care facilities were occupied by men and 370 men were admitted during a 5-month period (an average of 74 per month), then on the average, men must stay 12.69 months to keep these beds filled. Similarly, the average length of stay can be estimated for patients receiving levels of medical care that are too high, too low, or appropriate.

Table 7. Appropriateness of Care in Chronic Care Facilities, General Survey and Admissions Study

Appropriateness of care	Sample survey, percent	Admissions study, percent
Receiving appropriate care	60.5	51.8
Needing higher level	2.1	11.3
Needing lower level	37.4	37.0

Valid estimation by this method requires (in addition to category stability) that samples be random, that admission and discharge rates be constant, and that survey populations and discharge population have a Poisson distribution. Predictions based on such estimates must be viewed with caution, since some of the conditions may not be met precisely: in particular there is likely to be appreciable instability in the level-of-care category, and there will be shifts in age categories as the patient population ages in the course of the study. In this study such estimates generally overstated length of stay.

These estimates nevertheless provide useful clues for future investigation. By this method it was estimated that patients receiving too low a level of care stay on the average only 2.8 months, compared to much longer stays for patients receiving appropriate care (18.1 months) or too high a level of care (15.7 months). The most probable explanation is that after admission to chronic care facilities, patients who require a higher level of care either die or are transferred to higher levels of care.

When length of stay was calculated by this method for males and females separately, men were found to have shorter stays than women on the average (Table 8), except in the state mental hospital, where the estimated length of

Table 8. Estimated Average Stay for Aged Males and Females in Chronic Care Institutions

Type of institution	Survey population		Admissions for one month		Estimated average stay, months (survey / admissions)	
	M	F	M	F	M	F
All institutions	939	2497	74	147	12.7	16.9
Nursing homes	217	901	40	74	5.4	12.2
Homes for aged	185	864	8	19	23.1	45.5
Monroe County Infirmary	150	229	17	25	8.8	9.2
Rochester State Hospital	387	503	9	29	43.0	17.3

stay is greater for men. The shortest stays for men are those in nursing homes; for women the shortest stays are those in the chronic disease hospital (Monroe County Infirmary). The longest stays for men are those in the mental hospital; for women, those in homes for the aged.

The overall average duration of stay was estimated at 15.5 months. The longest stays were those for patients 90 years of age and over (25.6 months—approaching residual life expectancy), and the shortest—8.3 months—for those in the 70–74 age group.

Discussion

Estimation of Health Care Needs

In planning an appropriate array of health facilities, it has usually been convenient to assume that an existing array is de facto appropriate and to project an increase in facilities in proportion to expected population growth. Considerable data have accumulated, however, to indicate that all hospital utilization is not appropriate. Lowe and McKeown [11] found substantial misplacement of patients in English hospitals, especially in chronic care institutions, as did Berthaux et al. [12] in Paris. Earlier planning efforts in Rochester had indicated considerable misplacement in chronic disease facilities [13] and in general hospitals. Studies elsewhere have indicated similar conditions. In a study in Wolverhampton, England [14], it was estimated that 80 percent of aged persons are fully normal mentally (84.1 percent in the present study); 2.5 percent were found to be confined to bed and 8.5 percent confined to their homes. The Groningen study [8] suggested the need for 153 beds per 1000 aged persons in homes for the aged (present study estimates, 59), 34 beds in nursing homes (this study, 30), and 4.3 beds in general hospitals (this study, 8.0). A Nuffield Trust study in England [15] suggests that 95 percent of aged persons can live at home with suitable assistance (90 percent in this study).

Estimates of appropriateness of care were checked for reliability as described earlier, but it would be desirable to expose these judgments to clinical trial—that is, actually place a sample of patients in an "ideal" facility. Such a trial would be costly on an experimental basis and would require an intensive public relations program with both physicians and patients, but it is the only sure way to determine whether "optimal" placement will be acceptable to patients and their families and will in fact lead to improved health and function for aged persons.

Response Rate

The proportion of the enumerated population of aged persons who refused to participate (5.3 percent) or who could not be interviewed (6.8 percent) is similar to that in other studies of aged persons in Great Britain and the United States. In a survey of aged persons in an agricultural community in

the Middle West, Havighurst [16] completed interviews in 71 percent of the enumerated sample, compared with 88 percent in the present study. The refusal rate in his study was 11.8 percent, with the balance of incomplete returns explained by persons who had died or moved away or could not be interviewed for other reasons. A disproportionate number of upper-class widows and middle-class men and women were among those refusing—a finding at variance with the present survey.

The study of aged persons in Groningen [8], with 97 percent completed interviews, resulted in only 1.2 percent refusals, and data were obtained even on these from physicians and relatives. It is of interest that there was a 3 percent refusal rate in another study of aged persons in the Netherlands [17]. This was a countrywide survey of patients known to their personal physicians, and a lower refusal rate might have been expected than in the Groningen study, which was based on a randomly selected sample; but the study with 3 percent refusals required a physical examination and the other did not.

Professional Observers

The decision as to what health care is needed is generally regarded as the physician's responsibility, but he may not always be well informed regarding the availability of the needed services in different settings. In particular, for the chronically ill or disabled patient who does not require institutional care, nurse observers can often judge the supervision or services required as well as or better than physicians [18].

It might be argued that the importance of the physician's role in detecting unmet medical needs was demonstrated, in the first pretest of the questionnaire, by the finding of an unsuspected mass in one study subject. Detection of asymptomatic disease can be carried out almost entirely on an ambulatory basis, however, and the study specifically excluded ambulatory medical care. Discovery of asymptomatic disease may lead to hospitalization of a patient, but to count him as inappropriately not receiving care in a general hospital would be to distort the study findings. In a field survey the finding of previously undetected disease represents a backlog of inadequate medical care, not the average amount of general hospital care needed if there were no such backlog of needed care—just as the National Health Survey, in indicating the amount of previously undetected disease, does not reveal the amount and type of home care or institutional care needed by the population sample.

Implications for Planning

The major conclusion emerging from this study is that there is a large unmet need for congregate living facilities in Monroe County. By extrapolation, such a need may be presumed to exist generally in the United States, since the best estimates indicate a figure far below the estimated need of 59 places per 1000 aged persons in such facilities. A marked increase in public health nursing services provided to aged persons in their homes is also needed.

An associated basic need is for better financing mechanisms for the care

of aged persons. To a large extent the failure of aged persons to receive appropriate care is related to this need. If the care of elderly persons is reimbursed in nursing homes but not in homes for the aged, there will be understandable reluctance to transfer patients out of nursing homes. Furthermore, if "someone else" (usually the state government) is paying for the care of forgetful aged persons in mental hospitals, they will be left in these institutions if support is not available for their care elsewhere. Similarly, unless reimbursement is available for home care, service will be provided where it *is* reimbursed (e.g., in general hospitals) or it will not be provided.

The finding of many forgetful or confused aged persons living alone poses an important problem that is intensified by the surprisingly high correlation of such minor mental impairment with poverty. The correlation of mental illness with social class has long been recognized [19], but the strength of the association of minor mental impairment with poverty was unexpected, and it is hoped that future studies will test the validity of this observation. In this study, judgments as to forgetfulness were made by nurses and physicians after extended interviews in which confusion and forgetfulness were readily apparent; but objective tests of memory or orientation might well be employed to confirm or refute this finding.

Conclusions

1. Interviewing techniques and questionnaires based on the need for physical care and for supervision are highly reliable in estimating the health care needs of aged persons.

2. The enumeration of aged persons living at home presents peculiar difficulties; special techniques are needed to identify this population.

3. There is much inappropriate placement of aged persons, especially overplacement in mental hospitals and underplacement in congregate living facilities.

4. The ability of aged persons to live independently appears to be significantly correlated with age and social class. Forgetfulness and confusion, which were found to be conspicuously related to low social class, account for most of the inability of aged persons to live independently.

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