is there an alternative to the nursing home for north carolina's elderly?

The majority of North Carolinians can look forward to a long life, unthreatened by major epidemics of communicable disease and malnutrition. But even though most of us will reach the age of 65, it is likely we will be frustrated with one or more chronic conditions that will restrict the pleasures of normal activity. The present medical system, focused on the acute episode of illness, is poorly equipped to deal with the health needs of the chronically ill elderly. The medical system has run them in and out of expensive general acute care hospitals and discharged them, often disabled, with no provision for care other than family endeavors. When the burden of caring for an elderly family member becomes too great, the long term institution is often the only resort.

Institutionalization is an expensive answer to the problems of the long termed disabled. North Carolina spent over 10 million dollars in state Medicaid contributions in fiscal year 1975 to support the elderly in long term skilled and intermediate care facilities. This fact coupled with the realization that institutionalization can be a demeaning and hopeless way to spend one's last years have spawned an interest in two alternatives-home health and geriatric day care. Both programs are aimed at allowing the aged the option of remaining in the community by supplementing family support for aged members. This article attempts to analyze the three alternatives as they operate in North Carolina, from a cost effectiveness point of view.

health problems of the elderly

In 1970, 8.1 percent of the population in North Carolina was over the age of 65, compared to 9.9 percent of the total United States population. However, North Carolina's elderly population is growing at a faster rate than that of the U.S. The percentage increase in the population 65 and over between 1960 and 1970 in North Carolina was 32.7 compared to a 21.2 percent increase in the U.S. According to projections by the North Carolina Governor's Coordinating Council on Aging, the state can can expect the same rapid increase in the over-65 population during the next decade.

When the rapid increase in the number of elderly is considered along with the prevalence of chronic disabling conditions in that population, the magnitude of this problem becomes evident. The most recent U.S. Health Interview in 1972 reported that 38 percent of the U.S. population over 65 had some major activity limitation due to chronic conditions while 43 percent had at least some activity limitation.[2]

This declining physical ability, together with forced retirement and death of spouse and close friends, may contribute to a sense of worthlessness. The lack of meaningful social roles, or social isolation, may be a serious problem among the elderly.[3] In a 1973 survey of the elderly in Durham done by the Center for the Study of Aging and Human Development at Duke, an estimated 26 percent were lacking in some important amount or quality of social relationships.[4]

The chronic conditions of many elderly make them heavily dependent upon friends or relatives in carrying out the routine activities of daily living such as meal preparation, shopping and personal care. But if significant proportions of the elderly lack adequate social resources to help them cope with serious handicaps, institutionalization may be the only alternative. Even for those individuals with satisfactory social support, the enormous burden they place on their families may also hasten institutionalization.

institutional care

The combined effects of a rapidly increasing elderly population and a rising incidence of disabling illnesses have contributed to the growth of long term care institutions in this country. The number of skilled nursing and intermediate care facilities in North Carolina has risen rapidly since the passage of Medicare and Medicaid. In the decade 1966-75, the

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number of beds in these institutions in North Carolina have tripled as Table I shows.

Table 1
Nursing Beds in North Carolina
1966-1975

Year	Nursing home beds (skilled and intermediate care facilities)
1966-67	4,842
1968-69	5,250
1970-71	7,868
1972-73	9,050
1974-75	12,065

In order to receive Federal reimbursement all institutions must meet certain physical plant and service standards. A skilled nursing facility must have twenty-four hour registered or licensed nursing coverage while intermediate care facilities require a registered nurse only eight hours a day. State licensing law requires only two attendants on duty around the clock for rest homes.[6]

home health care

Home health services refers to those items and services furnished to an individual in his or her home by a home health agency. They are:

(1) part-time or intermittent nursing care provided by or under the supervision of a registered nurse.

(2) physical, occupational or speech therapy.

(3) medical, social services, home health aid services, and other therapeutic services.

(4) medical supplies, other than drug and biologicals, and the use of medical appliances.

(5) any of the foregoing items and services which are provided on an outpatient basis under arrangements made by the home health agency at a hospital or nursing home facility or rehabilitation center and the furnishing of which involves the use of equipment of such a nature that the items and services cannot readily be made available to the individual in his home.[7]

By law the home health agency must provide skilled nursing service and at least one other therapeutic service; services must be carried out according to a plan developed by a physician who reviews it at least once every two months. If these and other administrative requirements are met home health services may be reimbursed through Medicare and Medicaid and a limited number of private insurors.

North Carolina has 64 home health agencies of which 45 are operated by county health departments. The remaining 19 are private non-profit, proprietary or hospital-based agencies. Twenty counties in the state have no provision for home health services. Most home health visits are nursing visits, with home health aide visits and physical therapy being the next two most frequent services received. Occupational and speech therapy and medical social work services are rarely available. This past fiscal year 11,000 individuals or one-fourth of one percent of North Carolina's population received home health services. These figures include the total population who receive home health services, not just those persons over 65.

geriatric day care

Day care centers for adults provide services during week days for elderly and disabled persons in a neighborhood facility. The exact content of these services is not as well specified as home health or institutional care, probably because there is no one important source of federal funding for such services such as Medicare or Medicaid. The types of day care services delivered span the health spectrum from primarily medical care to social programs emphasizing peer group interaction. The British, who have made use of the day care concept long before the United States, developed their centers as day hospitals while the twenty centers in North Carolina have developed as social programs. Most North Carolina centers were initiated by local residents as public non-profit centers and are located in the basements of churches or in community recreational facilities. The majority of these programs receive some local funds, seed money from the Older Americans Act,[8] or resources from Title XX of the Social Security Act which provides money for state social services. In order to be certified to receive federal, state or county funds each center must:

- provide two meals for clients who stay 10 hours
- follow rules governing disbursement of drugs
- have a plan for emergency first aid
- assist participants with personal care needs such as eating or going up and down stairs.[9]

Programs and activities are not specified except that each facility "should provide for social, physical, emotional, intellectual and cultural activities which will stimulate feelings of accomplishment and well-being." The ratio of participants to staff should not exceed eight-to-one.

the substitutability of alternative forms of care

The discussion of alternative forms of care has proceeded on the assumption that some institutionalized elderly could be maintained in the community. Is it actually possible to help individuals remain in the community who would normally be placed in intermediate care of skilled nursing facilities? How many elderly who are presently institutionalized could be supported by the community? Two studies have attempted to provide answers to these difficult questions, one in the state of

Massachusetts and another in a six-county area of New York.

In 1970, the Massachusett's Department of Public Health carried out disability evaluations of patients in nursing homes and discovered that only 37 percent of the residents required full-time, skilled nursing care. Fourteen percent required no care, 26 percent needed minimal supervision and 23 percent needed limited or periodic nursing care.[10] In the New York study the nursing care needs and physical and mental functional conditions of a sample of nursing home patients were determined. Twenty-seven percent of the sample could have used a lower level of care than that provided.

A higher proportion of widowed patients and those residing in urban as opposed to rural areas were inappropriately placed in institutions. The authors concluded the amount of social support from spouses or from rural families who have a stronger "care for your own" ethic was very important in determining whether an elderly person would be institutionalized.[11]

The discrepancy is probably due to different criteria used to determine what constitutes a necessary placement. There is no absolute standard for appropriate placement in a nursing facility, but it is significant the two studies agree that substantial proportions of the elderly could function without nursing home care.

Life in the community is much prefered to life in an institution.

Photo by Daniel Fleishman

constraints on state policy options

Any change in the present system of health care delivery for the elderly would encounter legal, administratve and political obstacles. It is important to recognize the strength of these obstacles and how they might be effectively dealt with before any such change is planned.

legal constraints

The largest single barrier to free development of alternatives is the legal restriction on federal reimbursement for health care. While the Older Americans Act and Title XX of the Social Security Act stress the prevention of unnecessary institutionalization and the promotion of independence, the major sources of funds for health care for the elderly—Medicare and Medicaid—actually *encourage* institutionalization by strict standards for reimbursement. Medicare, Part A, will provide reimbursement for home health services only if the individual is hospitalized for three days prior to initiation of services and allows for only 100 visits per episode of illness. Part B of Medicare does not require prior hospitalization but pays for only 100 visits during the calendar year. The elderly person must be homebound, sick, in need of at least intermittent skilled nursing care and have an individual at home who is willing and able to learn how to take over their care. The deficiencies of this approach are many. The service is obviously targeted toward the elderly person who has suffered an acute episodic illness and is considered a short-term extension of acute hospital care rather than a long term alternative to institutionalization. Only 43

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percent of the 11,000 people using this service in North Carolina were carried on the caseload over three months in fiscal year 1975. The average number of visits per person was 21.2. The policy that at least one family member should be willing to take over the patient's care ignores the fact that many old people are at risk of institutionalization *because* they live alone or do not have the social supports necessary to maintain themselves in the community.

Medicare reimbursement is not available for geriatric day care. The first legal barrier is that the state has no licensing law for geriatric day care centers and such a law is necessary for a service to even be considered for Medicaid/Medicare certification. Secondly, day care in this state is primarily a social activity service and a medical component must be worked into a licensing law for Medicare certification.

administrative constraints

The traditional belief that physical well-being of the elderly means freedom from disease and handicaps rather than the ability to perform activities of daily living causes a fragmentation of services offered to the elderly both at the state and local level. The Home Health Branch of the Division of Public Health Services works with local public health departments to offer primarily nursing service while the Division of Social Services works with local social service departments to offer a homemaker/chore service and social work assistance to the elderly. The Social Services Division did not allocate any of its Title XX funds for adult social services to the Home Health Branch of the Division of Public Health Services. In an interview the Director of the Home Health Branch clearly saw the social service homemaker program as separate from home health. This dichotomy is a barrier to a comprehensive home health service that would function as a true alternative to institutionalization. Help at home - not 'maid service' but enough trained and supervised outside help to insure stability of the home as a substitute for an institution is critical for many patients. The home health aide-homemaker-housekeeper trichotomy is a deterrant to organizing care for the sick at home.[12]

political constraints

Behind the restrictive clauses of Medicare legislation lies the effective political power of the American Medical Association. The medical profession and its members are extremely jealous of their authority over the organization of medical care systems and their supervision over patient care. The Home Health Branch believes that home health services are underutilized partially because doctors do not refer people to it. Some physicians see home health and day care as a threat to their authority over patient care. Many physicians see the institution as the most convenient and only legitimate place for patient care. Slowly, some of the progressive federal and state legislation is passing over AMA opposition; however, the medical profession will continue to be a strong force in the shaping of alternative health care modes.

benefits of institutional care

In most studies of institutions the outcomes are treated as negative effects and certainly not as benefits. Our national policy with regard to the elderly reflects this research bias: institutionalization is to be avoided. This dark view of the effects of institutionalization is not unjustified. There is an *a priori* value that could be attached to remaining in the community; institutional life represents the ultimate segregation from the community and dependency.

In an article on the institutional environment Eisdorfer and Bennett describe how it fosters dependency.

> Dependency . . . is fostered by both the psychological climate and spatial arrangements. Old people seem to be rendered helpless in settings where there are many stairs to climb and corridors which are not differentiated from one another by signs or colors. In the name of operational efficiency . . . those programs for the most helpless and dependent are often promoted widely within an institution (e.g. bedrest) and these operate to promote increased dependence justifying the support system. Efficiency becomes a basis for reduction in alternatives which would require the exercise of judgment or choice by the individual . . .[13]

Another psycho-social quality of institutions is lack of variety in social roles. Passive roles observed include complaining, social withdrawal and sitting and watching.[14] The institutional atmosphere is not conducive to improvements in well-being.

There have been a multitude of studies measuring the specific negative effects of institutional life. Most of these studies, however, compare traits of the institutionalized groups to a control group living in the community. Lieberman, a University of Chicago psychiatrist who has done much of the American research on institutionalization, rightly contends that much of the negative conclusions of researchers are influenced by the characteristics of the elderly person prior to institutionalization or are associated with aspects of entering the institution. In order to overcome this bias, Lieberman compared a group of institutionalized individuals to a matched sample on a waiting list for the same institution and to a group of community controls. When he compared the institutional group to those on the waiting list he discovered that the latter had less impairment of cognitive functioning and were better off in terms of anxiety, anomie and interpersonal relations.[15] The institutional group was less emotionally responsive than the waiting list group.

Our society does view the long-term care institution as a place for the very sick, deviant, or helpless . . . it is not difficult to understand the feelings of fear and hopelessness associated with entering an institution.

As a result of his study Leiberman concluded that the negative outcomes associated with institutional life were more likely a result of the decline in ability precipitating institutionalization and the crisis reaction to the knowledge of institutionalization. This hypothesis is intuitively appealing. Our society does view the long-term care institution as a place for the very sick, deviant, or helpless and it is not difficult to understand the feelings of fear and hopelessness associated with entering an institu-

tion. Even if dread of institutionalization rather than the institutional life is the cause of the problem, Lieberman's reported improvements may be no more than an amelioration of the initial damage to the elderly individual that would never have occured had institutionalization not been prescribed.

benefits of home health care

For the past five years home health care has been vigorously espoused as an alternative to institutionalization. The elderly could be helped in a more familiar and therapeutic environment thereby increasing the likelihood of maintaining independence. Despite the fact that such proposals have progressed as far as senate subcommittees there has been no adequate evaluation of the benefits of home health. The one experimental study of a home health service discovered by this author was inadequate from which to generalize because the population studied was a privileged group of elderly from the Benjamin Rose Geriatric rehabilitation hospital.[16] Even with a select sample, the study's results were not completely encouraging. A group of 100 patients discharged from the hospital were randomly allocated to an experimental group who received help in home tasks and personal care and a control group who received no service. The three dependent variables measured were survival, contentment and number of days in long-term institutions. The only significant difference was fewer days of long-term care and this difference only appeared when the elderly patient had a care giver living with him in the household.

benefits of geriatric day care

The British began experimenting with geriatric day care almost twenty years ago. One of the first experiments was conducted at a geriatric hospital in Sunderland England.[17] A geriatric day center was established in an unused ward of the hospital and staffed with a full-time occupational therapist and secretary. The center also used the part-time services of a doctor, physiotherapist and social worker. Former patients of the geriatric center who were known to be living alone were allocated to a treatment group who attended the day hospital and to a control group. Both groups were pre-tested on their amount of sleep, degree of agitation, personal cleanliness, depression and self-impression of health. At the end of the six months the group attending the day center experienced a significant reduction over the control in the number of days in the hospital as well as a significant reduction in depression.

In 1972 the Federal Administration on Aging funded a day care center demonstration project at the Levindale Geriatric Research Center in Baltimore in which the effects of day care were compared to the effects of institutional life. A summary of the final report was presented at a gerontological convention in October, 1975.[18] The details of the methodology have not been published but the Levindale group concluded that the functional health state of the day care participants—in terms of their mental health and ability to perform the activities of daily living—was significantly improved over the institutional group. Although the families of participants were not formally studied, many indicated that they were relieved from the strain of caring for the elderly individual. The day care group included 35 elderly persons who were functioning at a low level—many of whom had experienced the death of a close family member and loss of meaningful social contacts. The program participants received the services of a registered nurse, nurse's aid and part-time social worker. The medical component of the center qualified it to receive Medicaid reimbursement.

measuring costs

Examining the cost of the three health care alternatives, the total *social cost*—federal, state and local expenditures, as well as individual expenditures for meals, housing and medical supplies necessary to support the older person in his or her home—must be taken into account.

costs of institutional care

The total capital and operating costs of a typical long-term care facility are shown in Table 2.

Table 2

Average Capital and Operating Costs of a Combination Skilled and Intermediate Care Facility in North Carolina[19]

	Capital Costs		Annual Operating Costs
Building and fixed Equipment	$800,000	Insurance	$ 5,100
Movable Equipment	125,000	Taxes	19,000
Site Acquisition @ 5 acres	75,000	Administration	64,125
Site Preparation	50,000	Building and Grounds	11,550
Engineering and Architect's fee	85,000	Dietary	115,125
Other	70,000	Housekeeping	28,500
		Nursing	331,125
TOTALS	$1,205,000		$574,525

To facilitate comparison of alternative program costs it is useful to transform the total costs above to an annual per person charge. These estimated costs are shown in table 3 below.

Table 3

Annual Per Person Costs of Institutionalization[20]

	10%	5%
Capital cost per resident per year	$1,175	$ 694
Operating costs per resident per year	5,320	5,320
TOTAL costs per resident per year	$6,495	$6,014

costs of geriatric day care

Figures for the capital and operating costs for four of the twenty centers in North Carolina were available through the Adult Services Section of the State Division of Social Services. While the data have some severe limitations they are presented as the best approximation of the cost of a day care program.[21] The average capital and operating costs of a day care center are shown in Table 4. The calculated annual charges are shown in Table 5.

Table 4

Average Capital and Operating Costs for Geriatric Day Care Centers in North Carolina

	Capital Costs		Annual Operating Costs
Renovation and Repairs	$2250	Salaries & benefits	$25,649
Movable Equipment (program and administrative	$4557	Rent, Utilities & maintenance	5,316
		Client transportation	6,641
		Supplies	2,573
		Food	6,205
		Other	1,798
TOTALS	$6807		$48,182

Table 5

Annual Per Person Program Costs of Geriatric Day Care[22]

	10%	15%
Capital cost per client per year	$ 32	$ 23
Operating costs per client per year	1784	1785
TOTAL costs per client per year	$1816	$1808

These data show that in terms of annual per person program costs maintaining an elderly person in a long-term care institution is three times as costly as a typical day care program would be. Enumeration of the program costs alone underestimates the true *social cost* of the day care alternative. The individual lives at home two thirds of the time and either he or his family incur additional support costs. The costs of medical care, personal care, food and housing should ideally be included in the analysis.

The costs of food and housing for the elderly were estimated in a study of services to non-institutionalized elderly prepared by the School of Public Affairs at the University of Minnesota.[23] The figures are calculated separately for those elderly living alone and those living with another person.

With these figures added to the operating costs per client the revised total costs are shown in Table 7.

Table 6

Estimated Per Person Housing and Food Costs[24]

	Annual Food Cost Per Person	Annual Housing Cost Per Person
Living Alone	$420	$1500
Living With Someone	420	870

Table 7

Estimated Annual Per Person Costs of Day Care in North Caroilna with Housing & Food Costs Added

TOTAL costs per client per year	10%	5%
Living alone	$3736	$3727
Living with someone	3106	3097

When an approximation to total social cost is used geriatric day care still results in significant cost savings over institutional care in North Carolina. Discounted at a rate of ten percent geriatric day care for an individual living alone is only 58 percent the cost of institutionalized care; at the five percent discount rate day care is 62 percent the cost of institutionalized care.

costs of home health care

Data on home health in North Carolina were obtained from a survey of county agencies conducted by the State Home Health Branch. The results of this survey show a wide range of per-visit costs across the state by category of home health worker.

Table 8
Costs Per Visit
Home Health Agencies

	Range	Average Cost
R.N. and L.P.N.	$ 9.55 - 29.30	$16
Health aide	4.10 - 28.00	10
Physical Therapy	10.17 - 41.48	not available
Male orderly	7.00 - 17.50	not available

The per visit costs are determined by a formula used by Medicare and Medicaid to calculate allowable reimbursement.

A problem in computing annual per person charges for home health care is the difficulty in determining the necessary number of visits. The present state average of 21 visits per person per year is considered insufficient to adequately support the elderly at the risk of institutionalization, so costs are computed for three levels of care: 1) one visit every two weeks, 2) two visits per week and 3) three visits per week.

Using the average per visit costs for nursing health aide care, the annual per person cost of home health is calculated below.

Table 9
Annual Per Person Program
Cost of Home Health Care

	R.N.	Health Aide
1 visit/ 2 weeks	$ 416	$ 260
2 visits/ week	1664	1040
3 visits/ week	2496	1560

With the housing cost used in estimating the costs of geriatric day care and with an annual per person food cost of $629.52 for elderly living alone or with another person, the total social cost of home health can be approximated.

Table 10
Annual Per Person Cost of Home
Health Care for Those Living Alone

	R.N.	Health Aide
1 visit/ 2 weeks	$2546	$2390
2 visits/ week	3794	3170
3 visits/ week	4626	3690

Table 11
Annual Per Person Cost of Home
Health Care for Those Living With Another Person

	R.N.	Health Aide
1 visit/ 2 weeks	$1916	$1760
2 visits/ week	3164	2540
3 visits/ week	3996	3060

The analysis of the costs of home health is somewhat artificial because most elderly would receive a combination of professional and para-professional services. It is intended to show that there is a continuum of costs for serving the elderly person at home depending on the person's disability level, personal care needs and living situation. It is likely that the elderly person living alone would be more expensive to maintain in a home health program; they have higher housing costs and would probably require frequent visits by aides or professional help. If they required frequent help from professionally qualified personnel it would probably be cheaper to maintain the individual in a day care center. Even if older persons living alone required only frequent personal care assistance from aides it would be at least as cheap to place them in day centers. Unless the elderly require continuous professional supervision at home, a home health program has a significant cost advantage over institutional care.

conclusion

Although the great majority of long-term facilities in North Carolina are proprietary, the state must approve plans for the construction of such skilled nursing and intermediate care facilities. Because the federal government is heavily involved in state medical expenditures, it has a large stake in assuring that all facilities constructed are necessary. In order to receive funds for patient reimbursement through Medicare and Medicaid or funds for medical facilities construction the state must project the need for facilities and permit only the amount of construction necessary to fill the projected needs.

In the next five years the State Division of Facility Services has projected an increase of 5,087 in the institutional population and will allow construction for 5,652 skilled nursing and intermediate care beds, or 47 new institutions. Assuming that the figures in the New York study of unnecessary institutionalization can be applied to this state, then 1,526 of the projected institutional population or approximately 30 percent, could be maintained in the community.

Even if the 1,526 older people lived alone $4,209,760 per year in total resource costs could be saved by maintaining these individuals in a geriatric day care program in the community. In addition, the state would save a significant amount in Medicaid reimbursements. The home health alternative represents a substantial savings over the institution but may be more expensive than the day program, especially if the elderly require frequent visits by professional personnel. There is also much uncertainty about the potential benefits of home health. The fragmentation of basic home health services and the restrictions on reimbursement make program adaptation and expansion difficult. The day care alternative, on the other hand, is organized under one agency of state government. At present federal funds for day care reimbursement are not available, but the hurdle is not impossible to overcome. The State of Maryland has enacted a day care licensing law and the Levindale Adult Day Center in Baltimore is eligible for Medicaid benefits. The Division of Social Services should strongly promote the enactment of a day care licensing law including a medical care component in the next session of the General Assembly.

North Carolina is currently pursuing the policy of many states — building an increasing number of long term care facilities at spiraling costs. If the state increased appropriations for day care centers and reduced the amount of allowable long term facility construction, savings could be significant-both to the state and individual residents. More importantly, the elderly could avoid the hopeless prospect of years in an institution and cope more successfully with the problems of old age in the community.

Footnotes

[1]William B. Clifford and Gary Faulkner, *North Carolina's Elderly Population: A Distributional Analysis.*

[2]*Vital Statistics of the United States*, U.S. Public Health Service, 1972.

[3]Ethel Shanas, et al., *Old People in Three Industrial Societies*, (New York: Atherton Press, 1968); *Working with Older People*, Volume II, U.S. Department of HEW, Public Health Service, 1969-1971. These are two of a series of references to the concept of social isolation that may be found in the literature.

[4]Older Americans Resources and Services Community Survey, Durham, North Carolina, 1973.

[5]North Carolina State Plans for Hospitals and Long-Term Facilities, 1966-1975.

[6]*Rules and Regulations for the Licensing of Nursing Homes*, (North Carolina: Department of Human Resources, Division of Facility Services, 1972).

[7]*Rules and Regulations for the Licensing of Home Health Agencies*, (North Carolina: Department of Human Resources, Division of Facility Services, 1971).

[8]Public Law 89-73, July 14, 1965, "The Older Americans Act of 1965," as amended May 3, 1973.

[9]*Day Activity for Adults, Standards for Certification*, (North Carolina: Department of Human Resources, 1974).

[10]Levenson Gerontological Policy Institute, *Alternatives to Nursing Home Care; A Proposal*, Prepared for use by the Senate Special Committee on Aging, (Washington, D.C.: U.S. Government Printing Office, 1971) p. 13.

[11]J.W. Davis and M.J. Giffors, "An Areawide Examination of Nursing Home Use, Misuse and Non-use," *American Journal of Public Health*, 61 (1971), pp. 1146-1155.

[12]F. Van Dyke, et al., "Organized Home Care: An Alternative to Institutions," *Inquiry*, 9 (June, 1972) p. 13.

[13]Carl Eisdorfer and Ruth Bennett, "The Institutional Environment" in *Issues in Long Term Care*, Sylvia Sherwood (ed.) (New York: Spectrum, 1975) p. 418.

[14]*Ibid.*, p. 418-419.

[15]M. Lieberman, et al., "Psychological Effects of Institutionalization" Journal of Gerontology, 23 (1968) pp. 343-353.

[16]Margaret Nielson, et al., "Older Persons After Hospitalization: A Controlled Study of Home Aide Service," *American Journal of Public Health*, 62 (August, 1972).

[17]E. Woodford-Williams, et al., "The Day Hospital in the Community Care of the Elderly," *Gerontologica Clinica*, 4 (1962) p. 241.

[18]*Cost Effectiveness Evaluation of the Levendale Adult Day Treatment Center*, Executive Summary (Baltimore: Levindale Geriatric Research Center, 1975).

[19]The cost breakdowns were obtained from a private firm that has built almost a dozen facilities in North Carolina. The figures are for a 120-bed facility operating at 90 percent occupancy which contains 80 percent intermediate care beds and 20 percent skilled nursing beds.

[20]This was done by converting the capital costs to an annual per person annuity paid over the life of the project and then adding the annual per person operating costs to obtain the total annual charge. Following a previous cost analysis of nursing homes, 40 years was

chosen as the life of the building and 15 years for the movable equipment. Although the life of land is theoretically perpetuity it is treated as 40 years here on the assumption that the value after 40 years is negligible at most discount rates. The correct rate of interest, assuming no market imperfections, can be found by determining from what sectors the funds for nursing homes are drawn and then measuring the opportunity costs of using the capital in those sectors. Because it is difficult to determine the sectors from which nursing home funds are drawn and the assumption of market perfection is a poor one, the interest rate is treated as a policy variable and a sensitivity analysis is performed using five percent and ten percent rates.

[21]The cost figures are projections for this fiscal year and are only rough estimates. Second, no centers are housed in new buildings. If North Carolina were to expend funds for day centers it is possible that future programs may incur the capital cost of building construction. However, no cost estimates for such construction are available and it is assumed that new centers will continue to pay rental for the use of existing space. Third, because the day centers are so new and are generally dependent on the small amount of public funds available for client reimbursement, staffing is minimal. If centers were staffed like the Levindale program, for instance, operating costs might be increased. Finally, there is wide divergence in the per-person costs for the four centers, making the average cost a less valid figure. However, the average is used in this analysis as only a first approximation of the cost of a day center program.

[22]The same reasoning used to convert institutional costs to per person annual charges can be used for the day centers. The average number of participants for the four centers is 27. The life of the movable equipment is again assumed to be 15 years. For the purposes of this analysis it is assumed that the renovated buildings have one half the life of newly constructed institutions or 20 years.

[23]Nancy N. Anderson, principal investigator, *A Planning Study of Services to Non-Institutionalized Older Persons in Minnesota,* (Minnesota: The Governor's Citizens Council on Aging, 1974).

[24]The yearly food cost was divided by two-thirds because day centers usually provide one meal and several snacks.