Cost-Effectiveness of Community-Based Long-Term Care: Current Findings of Georgia's Alternative Health Services Project

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Abstract: A study of the cost-effectiveness of community-based, long-term care was conducted with voluntary enrollees eligible for Medicaid reimbursed nursing home care. One year after enrollment, average longevity was greater for the 575 clients in the experimental group, but average Medicaid plus Medicare costs for this group were higher than for the 172 clients in the control group. Among those more at risk of entering a nursing home, costs for persons in the experimental group were somewhat lower than for those in the control group. The results suggest that community-based services targeted to those most at risk of institutionalization may be cost-effective. (*Am J Public Health* 1982; 72:353–358.)

Introduction

Nursing home charges for the indigent elderly constitute such an increasingly heavy burden on the public that the search for ways to meet the long-term care needs of this group and to reduce the rate of increase of the costs has become intense. Public criticism of nursing homes has added to the pressure to develop alternative modes of care that will substitute for nursing home care. Alternative modes of care, however, are not without cost. And while estimates have been made that a substantial proportion of the people in nursing homes do not really need to be there, it is an open question whether cost-effective alternatives can be provided to the elderly who would otherwise seek nursing home care. This paper addresses that question.

Early reports from the studies testing the cost-effectiveness of home health services compared to nursing home or regular hospital services suggested that considerable cost savings could be achieved by substituting alternatives to institutionalization.[1] There were cautions, however, that increased availability of home care services may not reduce overall public costs if these services are provided as additions to already existing services instead of as substitutes for existing services. Many of the first studies lacked methodological sophistication in that their estimates of savings were based on the judgment of health care professionals that in a certain percentage of the cases alternatives could have been substituted for nursing home care or hospitalization.[1] In these studies, the usual conclusion was that alternatives would have saved money.

As more carefully controlled studies were performed, findings emerged indicating that alternatives may in fact produce positive health outcomes but at increased cost. Employing an experimental design, the evaluation of demonstration projects authorized under Section 222 of the Medicare law found that homemaker services were significantly more costly, and, although an experimental group lived longer, that group also had a higher rate of hospitalization than the control group.[2] Weissert and his associates also noted that "effective screening of patients to limit those served to patients 'at risk' of institutionalization would improve cost saving prospects."[2]

Achieving cost savings through community-based, long-term care depends on substituting community care for some institutionalized care. If alternatives supplement rather than substitute for institutional services, the additional services will add to the cost. As Doherty pointed out, total cost for health care services may only be limited by supply, since demand may be effectively infinite.[3] More importantly, it may be difficult to divert substantial numbers of people who definitely would otherwise have entered a nursing home. The existing evidence indicates that most nursing home residents who might be well served by alternatives have insufficient support in the community to enable them to use alternatives and avoid nursing homes.[4] So, the question becomes, "How much deinstitutionalization can community services realistically be expected to bring about?" Without a carefully designed study of a system of mandatory prescreening of nursing home applicants, there seems to be no valid way to answer that question. The Section 222 Medicare projects' evaluation and the current study examine the cost-effectiveness of community-based health services that were offered on a voluntary basis.

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Materials and Methods

The Georgia Alternative Health Services Project*

The community-based health services reported on in this paper were offered through a demonstration project supported by a grant from the Health Care Financing Administration of the US Department of Health and Human Services. The Alternative Health Services (AHS) Project was administered by Georgia's Department of Medical Assistance (Medicaid program) and was designed to test the cost and effectiveness of a comprehensive system of community-based care services for Medicaid eligible elderly (age 50 or older) who were eligible for nursing home care.

Three types of services were offered through the project: 1) Alternative Living Services (ALS); 2) Adult Day Rehabilitation (ADR); and 3) Home Delivered Services (HDS).

- ALS providers offered personal care services and supervision in special living arrangements for clients who were unable to live independently in their own homes.
- ADR provided ambulatory health care and health-related supportive services within an adult day health center for clients who did not need 24-hour care. Services available at or through the ADR centers were: nursing services; medical social services; therapeutic activities, including physical, speech, and occupational therapy; a noon meal; and transportation to and from the center.
- HDS covered home health services, including nursing care, physical, speech and occupational therapy, and home health aide service. HDS also included homemaker/chore service, home-delivered meals, medical social services, medically-related transportation, and special appliances and equipment.

Potential clients for the project lived in 17 contiguous Georgia counties, which included the seven counties surrounding Atlanta and the ten counties surrounding Athens. The Atlanta area is predominantly urban with a population of approximately 1.8 million; the Athens area is predominantly rural with a population of approximately 200,000. Clients were referred by a number of sources including hospitals, nursing homes, and community service agencies; direct applications were also made by the clients themselves and their families. A decision was made by an assessment team composed of a project nurse, social worker, and caseworker on whether or not the applicant was appropriate for project services. The decision was based on information collected by the caseworker in a structured interview with the client and with someone who knew the client well, and on medical information obtained from the client's physician. Prior to beginning formal screening, the experimental nature of the project was explained, and the consent of the client and/or the client's guardian was obtained.

If a client was judged appropriate for project services, the assessment team recommended a single project service or package of services tailored to that client's needs. This recommendation did not result in a service referral, however, unless the client was assigned at random by the research staff to the experimental group. Three-fourths of the clients judged appropriate were assigned to the experimental group and one-fourth to the control group. Experimental group clients were referred to providers of the service or service packages recommended by the assessment team. Control group clients remained eligible for any regular Medicaid or other long-term care services, including some which were in the project's package of services, namely, home health services and limited medically-related transportation and equipment. Control group members did not have Medicaid coverage for any of the other project services.

Data collection began in December 1976 and continued through July 1980. Prior to enrollment and every six months thereafter, outcome measures of health status and morale were obtained by trained research interviewers through structured interviews. These measures included Mental Status,[6] Morale,[7] Walking Independence and Mobility,[8] Activities of Daily Living,[9] and Instrumental Activities of Daily Living.[10] Project service and other Medicaid and Medicare utilization and payments were obtained from the state's Medicaid Management Information System (MMIS). Dates of death were obtained through attempted follow-up interviews or through service providers and checked against dates found in the MMIS.

The 747 clients enrolled prior to October 1978 were included in this analysis of utilization, costs, and mortality within 360 days of enrollment. Clients were followed until death or for 360 days, whichever period was shorter. The experimental group contained 575 cases, and the control group contained 172 cases. The majority of the experimental group clients (73 per cent) received the service (either alone or in combination with another service) for which they were recommended. Only 22 per cent of the experimental group failed to receive any project services. Failure to receive a recommended service could be due either to a client's refusal to accept the service or to a provider's refusal to accept a client.

Three major dependent variables were chosen for an analysis of the cost-effectiveness of community-based long-term care: monthly Medicare and Medicaid costs, nursing home days, and days of survival within 360 days of client enrollment. Project service costs were estimated by adjusting payment amounts according to audits conducted by the project's accounting staff. For other Medicaid and Medicare services, the payment amount was used as the best available estimate of service cost. It should be noted that the costs of screening for and case management of project services have not been included. Nursing home days are the number of days a client spent in a nursing home in the 360-day period following the assessment team conference. Survival days represent the number of days the client lived after the team conference up to and including the 360th day following the conference. Significant differences were determined by the t test for mean differences. Where population variances were unequal, the method of Cochran and Cox was used to approximate the t value.[11]

*For a more detailed description of the project, the reader is referred to Skellie and Coan.[5] Project services began to be offered as part of the state's regular Medicaid program in August 1980.

Results

Table 1 compares the experimental and control groups on several baseline demographic and social support measures. No statistically significant differences existed between the experimental and control groups on any of the available measures. Both groups had an average age of about 75 years, were about evenly distributed between White and Black, tended to be female, widowed, and not well educated; average monthly income was less than $200; almost all were in a private residence or boarding home initially; the majority lived with others at baseline; most lived in metropolitan Atlanta; most had a key person who would continue to help as long as she/he could; and most referrals came from county Departments of Family and Children Services (DFACS).

TABLE 1—Baseline[a] Demographic and Social Support Measures by Enrollment Group[b]

	Experimental %	Control %
Age (years)		
50–59	8	8
60–69	20	14
70–79	34	35
80–89	29	37
90 or Older	9	6
(*N*)[c]	(564)	(168)
Sex		
Male	26	28
Female	74	72
(*N*)	(575)	(172)
Race		
White	50	54
Black	50	46
(*N*)	(575)	(170)
Education (years)		
0–8	84	88
9–12	13	18
13 or More	3	4
(*N*)	(536)	(159)
Monthly Income		
$ 0–100	6	6
101–150	16	18
151–200	68	68
200 or More	10	9
(*N*)	(563)	(171)
Marital Status		
Married	24	27
Widowed, Separated, Divorced	66	67
Single	10	6
(*N*)	(570)	(172)
Initial Residence		
Private or Boarding Home	93	90
Other	7	10
(*N*)	(569)	(170)
Others at Residence		
Alone	32	34
With Others	68	66
(*N*)	(569)	(169)
Key Person Continued Help		
As Long as Client Wishes	15	17
As Long as Can	61	60
Not Very Long	6	7
Cannot Continue	2	1
Do Not Know	2	1
Does Not Apply	14	14
(*N*)	(503)	(151)
District		
Metropolitan Atlanta	61	65
Athens Area	39	35
(*N*)	(574)	(172)
Referral Source		
Self, Family, Friends	28	30
Physician, Hospital, or NH	16	18
DFACS (Welfare)	58	52
(*N*)	(433)	(136)

[a]Obtained at initial interview prior to enrollment.
[b]For clients enrolled prior to October 1978.
[c]Total number of complete cases on which percentage was calculated.

Comparisons of baseline functional status, primary diagnosis, and Assessment Team service recommendation are shown in Table 2. The only statistically significant difference occurred in the distribution of mental status scores of the two groups. Proportionately more experimental clients missed only 0–1 items, while more controls missed 2–3 items. However, the mean number of items missed was approximately the same for both groups.

Table 3 presents the average monthly service costs (Medicaid plus Medicare) per person for the total months in which they were alive. The control group by definition did not receive services provided through the Alternative Health Services (AHS) Project. Outpatient hospital, regular Medicaid or Medicare home health, and other service costs were similar for the experimental and control group. Drug costs were significantly higher for the experimental group. Physician costs and nursing home costs were lower for the experimental group, although the differences were not statistically significant.

Overall average costs were significantly higher for the experimental group (Table 4). The data in Table 4 also show that the experimental group spent somewhat fewer days on the average in a nursing home, and lived longer.

The death rate was also higher in the control group, (21 per cent compared to 13 per cent in the experimental group). Somewhat more deaths occurred within the first six months after enrollment than within the seventh through twelfth month, with 12 per cent of the control group and 7 per cent of the experimental group dying within the first six months. There was no evidence to indicate that the quality of life was lower among survivors in the experimental group. Survivors in the experimental group did not differ at 12 months from survivors in the control group on Mental Status, Morale, Walking Independence, Mobility, Activities of Daily Living, or Instrumental Activities of Daily Living.

As noted earlier, despite random assignment, there was a difference in the distribution of mental status scores between the experimental and control groups (Table 2). It is possible that the differences between the experimental and control groups on survival days and costs were due to sample differences, rather than to the use of project services in the experimental group. This possibility was investigated by comparing subgroups of the experimental and control group, controlling for baseline mental status. The results of the survival day analysis are shown in Table 5.

Within each level of baseline mental status score, mean survival days were higher for the experimental group compared to the control group. The mean survival day difference

TABLE 2—Baseline[a] Functional Status, Diagnosis and Service Recommendation by Enrollment Group[b]

	Experimental %	Control %
Mobility		
No Help	33	32
Equipment/Device	27	36
Personal Assistance	25	17
Does Not Go Outside	15	15
(*N*)[c]	(573)	(171)
Walking		
No Help	43	47
Cane	17	18
Crutches, Walker, Etc.	15	13
Personal Assistance	13	9
Does Not Walk	12	13
(*N*)	(565)	(172)
Activities of Daily Living		
0–1 (Most Independent)	64	70
2–3	20	14
4–6 (Most Dependent)	16	16
(*N*)	(565)	(170)
Instrumental Activities		
1–2.00 (Most Independent)	43	43
2.00–3.00 (Most Dependent)	57	57
(*N*)	(574)	(172)
Mental Status (SPMSQ)**		
0–1 Items Missed	36	24
2–3	29	46
4–7	24	23
8–10 Items Missed	12	8
(*N*)	(495)	(146)
Primary Diagnosis		
Neoplasms	4	5
Endocrine and Related Disorders	7	9
Mental Disorders	5	2
Diseases of Nervous System and Sense Organs	6	5
Diseases of Circulatory System	49	51
Diseases of Respiratory System	4	3
Diseases of Genitourinary System	3	5
Diseases of Musculoskeletal System and Connective Tissue	11	11
Fractures and Other Injuries	4	3
Other	7	6
(*N*)	(535)	(156)
Service Recommendation		
ALS or ALS/Other	17	20
ADR, HDS, or HDS/ADR	83	80
(*N*)	(572)	(172)

[a]Obtained at initial interview prior to enrollment.
[b]For clients enrolled prior to October 1978.
[c]Total number of complete cases on which percentages were calculated.
**$\chi^2 = 17.18$, df = 3, $p < .01$.

between experimentals and controls obtained for the total sample cannot be attributed to mental status differences at baseline. Cost and nursing home day comparisons were similarly unaffected by the mental status score differences.

The findings presented in Table 4 cover the entire sample for 12 months (360 days). Table 6 presents findings for a subsample that was more likely to have substituted community care for nursing home care, clients initially recommended for Alternative Living Service (ALS). Compared to the total enrollment sample, clients recommended for ALS were somewhat more independent in mobility and walking but more impaired on mental status and instrumental activities. It was judged that without ALS many would have little choice except to enter a nursing home, even though their primary need was for a supervised living arrangement. Substitution of community services for institutional services was more likely than for the sample as a whole.

Table 6 reports on the same variables as did Table 4 but is restricted to clients who were recommended for ALS at their assessment team conference. For this subsample, none of the differences between the means were statistically significant. The experimental group, however, on the average spent fewer days in a nursing home, lived longer, and used health services costing somewhat less than those used by the control group.

Discussion

Results for the total sample suggest that alternative services have reduced mortality and that the services may have been marginally effective in reducing the number of days spent in a nursing home. However, total Medicaid plus Medicare costs were higher for individuals with access to alternative services, averaging $90 a month more. These findings are consistent with the earlier reports from Weissert, *et al.*[2] It appears probable that the voluntary provision of these services to individuals who were eligible for nursing

TABLE 3—Average Monthly Medicaid plus Medicare Costs per Person during Survival Period, by Enrollment Group

		Experimental	Control
AHS (Project services)	Mean	$111	$—
	St. Dev.	111	—
Nursing Home	Mean	42	58
	St. Dev.	123	232
Inpatient Hospital	Mean	119	98
	St. Dev.	330	274
Outpatient Hospital	Mean	11	10
	St. Dev.	33	23
Home Health	Mean	6	5
	St. Dev.	29	23
Physician	Mean	27	52
	St. Dev.	52	190
Drugs*	Mean	15	12
	St. Dev.	18	15
Other	Mean	10	17
	St. Dev.	24	61
(N)		(565)	(169)

*$p < .05$

TABLE 4—Nursing Home Days, Days of Survival, and Monthly Costs by Enrollment Group

		Enrollment Groups	
		Experimental	Control
Nursing Home Days	Mean	25	28
	St. Dev.	72	86
	(N)	(575)	(172)
Survival Days*	Mean	335	318
	St. Dev.	72	97
	(N)	(566)	(169)
Medicare Plus Medicaid Costs for Survival Days*	Mean	$341	$251
	St. Dev.	418	462
	(N)	(565)	(169)

*$p < .05$

TABLE 6—Nursing Home Days, Days of Survival, and Monthly Costs for ALS Recommendees by Enrollment Group

		Enrollment Groups	
		Experimental	Control
Nursing Home Days	Mean	63	97
	St. Dev.	110	140
	(N)	(95)	(34)
Survival Days	Mean	316	303
	St. Dev.	99	113
	(N)	(93)	(32)
Medicare Plus Medicaid Costs for Survival Days	Mean	$377	$408
	St. Dev.	488	570
	(N)	(93)	(32)

home care has resulted in many clients not at risk of entering a nursing home receiving add-on services, instead of substituting services for nursing home care.

For clients more at risk of entering a nursing home, the results were more positive. Clients who were recommended for Alternative Living Services by the assessment team were considered to be more at risk of entering a nursing home. The ALS recommendees in the experimental group survived longer, spent fewer days in a nursing home, and their service costs were somewhat less than for ALS recommendees in the control group. It should be noted that the experimental-control group differences for this subgroup were not large enough to be statistically significant, and thus should be interpreted with caution. Further, any additional public costs related to screening for or case management of project services have not been included. On the whole, the results do suggest the possibility that community-based services can substitute for nursing home services if the population served is likely to enter a nursing home.

Whether or not community services can be cost-effective is a complex question. The figures presented here were for the first 12 months of project participation, and included a start-up period for many providers. As the project has continued, providers have moved beyond the initial phase into a more regular pace. In the coming months these findings will be updated as data become available for the first two years of enrollment and for a larger number of clients who have completed at least 12 months of service.

Current findings suggest, however, the importance of the target population served by community-based long-term care. In Georgia, mandatory prescreening of Medicaid-eligible nursing home applicants for appropriateness of alternative services has been suggested as a mechanism for identifying people for whom community services might substitute for nursing home care. Research on mandatory prescreening could lead to a more adequate test of the cost-effectiveness of community-based care.

TABLE 5—Days of Survival by Baseline Mental Status by Enrollment Group

Mental Status (SPMSQ)		Enrollment Groups	
		Experimental	Control
Items Missed			
0–1	Mean	338	317
	St. Dev.	69	87
	(N)	(176)	(33)
2–3	Mean	341	331
	St. Dev.	64	82
	(N)	(139)	(66)
4–7	Mean	338	309
	St. Dev.	66	110
	(N)	(118)	(33)
8–10	Mean	326	227
	St. Dev.	86	151
	(N)	(55)	(11)

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