Expenditures for long-term care services by community elders

by Hirsch S. Ruchlin, John N. Morris, Claire E. Gutkin, and Sylvia Sherwood

Costs of care are presented for elderly persons in five community-based settings. These settings include elderly persons living in their own homes or in group housing and who do or do not receive case-managed home care. Expenditures for care ranged from a low of about $1,100 per year to a high of $4,025. The level of expenditure was directly related to risk of institutionalization and was higher for those receiving case-managed home care. As a majority of the elderly use a substantial amount of care even without case management, the potential for community care demonstration programs to yield significant cost savings appears quite limited.

Introduction

The aging of the U.S. population is forcing social and health planners to attempt to develop service packages that will be increasingly needed by the frail elderly. A consensus has emerged in the gerontology community, motivated by both quality of life and cost considerations, that individuals should be maintained in a community setting for as long as possible. Early efforts at promoting community living through the provision of regular home care or case-managed home care have not yielded the anticipated reduction of institutional use that was the implicit or explicit expectation underlying many of these demonstrations (Weissert, 1985; Kemper, Applebaum, and Harrigan, 1987). We now recognize that home care alone cannot be the base upon which new long-term care delivery systems are developed.

An obvious, but partially neglected, base for new long-term care programming is housing (Congressional Budget Office, 1977; Beland, 1984; Rice and Estes, 1984; Newman, 1985). This crucial program element, either with or without a case-managed home care add-on, may provide the key to maintaining community residency. An important element in developing housing-based models is knowledge of service use patterns by a cross-section of the elderly in various housing/care arrangements. Some of the necessary data in this area are provided in this article. We present annual expenditure estimates for both institutional and community-based social services used by elderly persons in five actual community settings. These settings are:

- Elderly persons living in their own homes or apartments and not receiving case-managed home care.
- Elderly persons living in their own homes or apartments and receiving case-managed home care.
- Individuals living in publicly or privately sponsored housing for the elderly and not receiving case-managed home care.
- Individuals living in publicly or privately sponsored housing for the elderly and receiving case-managed home care.
- Elderly persons living in publicly or privately sponsored, service-enriched congregate housing, where meals and other social services are provided under the building's auspices.

Methods

The study sample

Four longitudinal data sets drawn from studies conducted by the Department of Social Gerontological Research, Hebrew Rehabilitation Center For Aged, were used to generate the five study cohorts. These data sets and the time periods during which they were collected are:

- A stratified random sample of individuals 62 years of age or over, living in Massachusetts in a community setting during the baseline time period (1982-83).
- A stratified random sample of elderly clients served by Massachusetts Home Care Corporations, which was providing State-financed, case-managed home care (1982-83).
- Experimental and control participants in the National Congregate Housing Services Program evaluation, representing sites across 14 States[1] (1980-84).
- Senior center clients from the State of Delaware (1979-81).

The study cohorts assembled from these data sets represent a broad range of the elderly living either in their own homes and apartments or in some type of group housing. Furthermore, these individuals reflect the type of elderly persons who tend to be clients of case-management home care programs. Thus, their use and cost profiles represent the spectrum of elderly persons participating in regular or targeted long-term care service programs.

To partially control for the heterogeneity of sample members drawn from each of the four data sets,

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Reprint requests: Hirsch S. Ruchlin, Ph.D., Department of Public Health, Cornell University Medical College, 1300 York Ave.-Box 4, New York, New York 10021.

[1]California, Colorado, Connecticut, Florida, Massachusetts, Minnesota, Missouri, New Mexico, North Carolina, North Dakota, Ohio, Oklahoma, Rhode Island, and South Dakota.

Table 1

Conditions governing assignment to the high institutional risk category

High risk condition number	Condition or situation			
	Functional problem	Years of age	Health-related issues	Social or living status
1	3 IADL[1] problems and 2 or 3 ADL[2] problems	75 or over		
2	2 IADL problems and 2 or 3 ADL problems	80 or over		
3	3 IADL problems or 1, 2, or 3 ADL problems	80 or over	Fell during previous 3 months	
4	3 IADL problems or 1, 2, or 3 ADL problems	75 or over	Has mental or emotional problems	
5	1, 2, or 3 MSQ[3] errors		Fell during previous 3 months	
6	1, 2, or 3 MSQ errors	85 or over		
7	1, 2, or 3 ADL problems	80 or over	Was previously in an institution	
8	1, 2, or 3 ADL problems	75 or over	Has cancer	Does not live alone
9	1, 2, or 3 IADL problems and zero ADL problems	80 or over		Female with no children nearby

[1]IADL is instrumental activities of daily living, a three-item index.
[2]ADL is activities of daily living, a three-item index.
[3]MSQ is mental status quotient, a three-item index.

SOURCE: Hebrew Rehabilitation Center For Aged: Data from the Department of Social Gerontological Research.

Table 2

Distribution of elderly persons, by housing and service setting and institutional risk (IR) category

Housing and service setting	Total number in setting	Percent of persons within each IR category			
		Very low	Low	Some	High
Total	4,703				
Living in own home, not receiving case-managed home care	2,306	40.9	19.3	26.2	13.6
Living in own home, receiving case-managed home care	752	12.1	10.9	29.8	47.2
Living in housing for the elderly, not receiving case-managed home care	344	22.7	18.3	17.2	41.9
Living in housing for the elderly, receiving case-managed home care	410	7.8	11.7	42.9	37.6
Living in service-enriched congregate housing	891	27.5	11.2	8.1	53.2

SOURCE: Hebrew Rehabilitation Center For Aged: Data from the Department of Social Gerontological Research.

individuals were assigned to one of four institutional risk (IR) categories (very low, low, some, or high) using a classification system developed by three of the authors of this article (Morris et al., 1987; and later modified in Morris, Sherwood, and Gutkin, 1988). IR assignment follows a complex, multivariate model that statistically classifies elderly persons into one of the four IR categories. To illustrate the nature of this classification system, the nine types of conditions resulting in assignment to the highest-risk group are displayed in Table 1. Individuals in the very low group are characterized by an almost complete absence of functional deficits; the majority of them do not live alone; and only about 17 percent are over 80 years of age. They have an expected 24-month institutional rate of less than 1 in 100. Elderly persons in the low IR group are predominantly female, unmarried, and have about a 3-percent chance of being institutionalized over a 2-year period. Individuals in the category of some institutional risk have an expected IR rate of about 6 percent. These people tend to have some functional deficits, and the majority of them are female, without a spouse, and are 80 years of age or over. People in the high category tend to have more severe functional, mental status, or discrete health problems. Their expected rate of institutionalization is more than 20 percent.

The number and distribution (by IR level) of elderly persons in the study sample across the five housing and service settings are shown in Table 2.

Table 3

Shadow prices representing prevailing average third-party payment rates, by type of service: Massachusetts, 1985

Type of service	Unit cost estimate
Institutional care	
Acute care hospital day[1]	$428.13
Physician inhospital care[2]	
Initial visit	51.60
Subsequent visit	31.25
Nursing home day[3]	52.10
Community-based care	
Meal assistance (one hour)[4]	4.94
Transportation (round trip)[5]	18.40
Homemaker/housekeeping/shopping and errands (one hour)	8.01
Home care/personal care (one hour)[6]	13.35
Case-management administrative component (annual cost)	
For those in own home or housing for the elderly[7]	315.59
For those in service-enriched congregate housing[8]	632.07

[1]Average daily charge, $639, (provided by the Massachusetts Hospital Association) adjusted for a Medicare average cost/charge reimbursement ratio of 67 percent. (Health Care Financing Administration, 1985).
[2]Current, prevailing, and reasonable fee for an internist (Health Care Financing Administration, 1984). Because of the Medicare fee freeze, 1984 rates remained in effect in 1985.
[3]Combined Medicaid rate for a skilled nursing facility/intermediate care facility.
[4]Based on a doubling of the cost of a home-delivered meal ($2.47).
[5]Cost for chair-car service.
[6]Average of a regular home care visit ($12.41 per hour) and visiting nurse care ($14.29 per hour).
[7]Derived from Ketron (1982).
[8]Derived from Ruchlin and Morris (1987).

Data sources

Utilization data were collected from study participants (or their proxies)[2] through direct interviews and represent activity occurring over a 12-month period. For institutional care, participants were asked to identify each episode of hospital or nursing home use and the length of stay of that episode. Where precise data could not be provided by the respondents, facilities were contacted to obtain information on length of stay. Data on use of formal community services (meals, housekeeping, chore services, personal care, medications management, transportation, and shopping assistance) were gathered by asking participants to indicate use of each of these seven services for an average 2-week period in which use occurred, and to indicate the number of months in which the service was used. The availability of data on outpatient physician services varied across the data sets; consequently, these data were omitted from this analysis. Inflating the 2-week use data to a monthly level and multiplying this number by the length of service use yields the estimate of overall service use during the 1-year followup period. In instances where the followup was less than 1 year, the aggregated unit counts were inflated to represent a full 12-month period. Where specific service use data were missing, regression-derived estimates were generated. Individuals who died were not deleted from the study. In about 90 percent of these cases, data on their care patterns were obtained from proxies. These data, which reflect use over a period that is less than 1 year, were included in the appropriate cells. In the very few instances in which no proxy-supplied data could be obtained, these individuals were excluded and the remaining number of cases in each cell was weighted up to the baseline level.

Estimates of expenditures for care were obtained by converting use profiles into dollar amounts through the use of shadow prices, representing prevailing average third party payment rates in Massachusetts in 1985. These rates were obtained primarily through a survey of State agencies and select local providers. In addition to service-use costs, an annual administrative cost for the case-management service was obtained and included in the expenditure profiles of those individuals receiving case-managed care. These shadow prices are reported in Table 3. In generating the expenditure profiles, it was assumed that for each hospitalization, a person had an initial visit by a physician on the first day and a regular visit on each subsequent day.[3]

Analytic strategy

Individual expenditure profiles were aggregated for each of the five housing and service settings and analyzed at three levels: total expenditures for all care, expenditures for institutional care, and expenditures for community services. These three measures formed the dependent variables in the ensuing analyses.

Inspection of the expenditure profiles immediately revealed low and high outlier values at each end of the distribution. This results primarily from instances in which no service use was reported and from the high cost of a hospital day relative to the cost of the other services included in this study. Two steps were taken to exclude or reduce the impact of outlier values. First, individuals who had no service use were excluded from the data sets used to generate the expenditure profile. However, this phenomenon—use versus nonuse of services—is also analyzed in this study. Second, expenditure patterns for service users were transformed into natural logarithms, and all statistical analyses were conducted on the logarithmic data. (Average expenditure patterns for both users and nonusers can be derived by combining the data appearing in Tables 5 and 6.) To present information

[2]Proxies were almost always a spouse or child. For those few in institutions during the followup period who could not provide the requested information, knowledgeable staff served as proxy-respondents.

[3]Thus physician visits assumed for the hospitalization episode are counted in this study as part of institutional expenditures. Their magnitude, vis-a-vis the cost of a hospital day, is so small as to introduce no serious distortions in the ensuing profiles.

more clearly to the reader, the antilogs of these data are used in the ensuing graphs and tables. (That is, log data were converted back to their arithmetic form. It is noteworthy that the antilog values are quite similar to each cohort's median value.)

Two steps were taken to heighten the comparability of individuals in each of the housing and service settings. First, as noted previously, the IR system was used to partition each cohort into four subcategories based on expected risk of institutional placement. Second, covariate adjustment procedures were used to derive sets of adjusted use and expenditure estimates

Table 4

Presence of impact on use and costs of selected personal characteristics and service history variables

Variable	All care	Institutional care	Community-based care
Personal characteristic			
Sex			
Lives alone	[2]x		x
Lives with child	x		x
Economic status	x		x
Functional status			
Needs help in meal preparation			
Is able to walk stairs without help	x		
Uses walker, cane, or wheelchair			
Is able to dress self			
Needs help with feeding			
Is able to do shopping/ errands on own	x	x	x
Is able to manage medications on own			
Receives informal help			
Has informal support strengths in five areas[1]			x
Personal activities of daily living score (range 0-3)	x		
Medical status			
Admitted to hospital in past year	x	x	
Admitted to long-term care facility in past year	x		x
Number of health conditions	x		x
Number of months since last physician visit	x	x	x
Fell during previous 3 months	x	x	x
Mental health status			
Orientation score			
Knows correct year			

[1]The five areas are: presence of spouse, proximity of child, provision of any informal supports, subject attitude about informal supports continuing, and subject attitude concerning the willingness of informal support system members to provide more help if necessary.

[2]x = Variables selected as covariates for the ensuing analyses.

SOURCE: Hebrew Rehabilitation Center For Aged: Data from the Department of Social Gerontological Research.

controlling for differences in the characteristics of each cohort's membership. An extensive review of the published and unpublished literature was conducted to identify potentially important covariates. Twenty-one covariates were identified representing personal demographics, functional status, medical status, and mental health status. To isolate the subset of variables to be used as covariates, a series of partial correlation matrices was examined, after controlling for IR status. A split-half approach was used with the sample randomly divided into two halves. Variables with significant partial correlations at $p \leq 0.05$ in each split half were then used in a stepwise regression analysis to obtain a set of significant covariates for each dependent variable. The rule used to select a significant covariate is whether its entry would increase the adjusted R^2 coefficient by a value of .01 or more. Separate regressions were run for each of the IR groups. The variables entered into these regressions and those selected as covariate adjusters are identified in Table 4.

The SPSSx program MANOVA (generalized multivariate analysis of variance and covariance) was used to assess significant differences across the five housing and service settings. When an overall analysis of covariance was significant (displaying an F-statistic significant at $p \leq 0.05$), a series of contrasts was completed to differentiate among subsets of the five housing and service models. Significant contrasts were those with t-values significant at $p \leq 0.05$.

Results

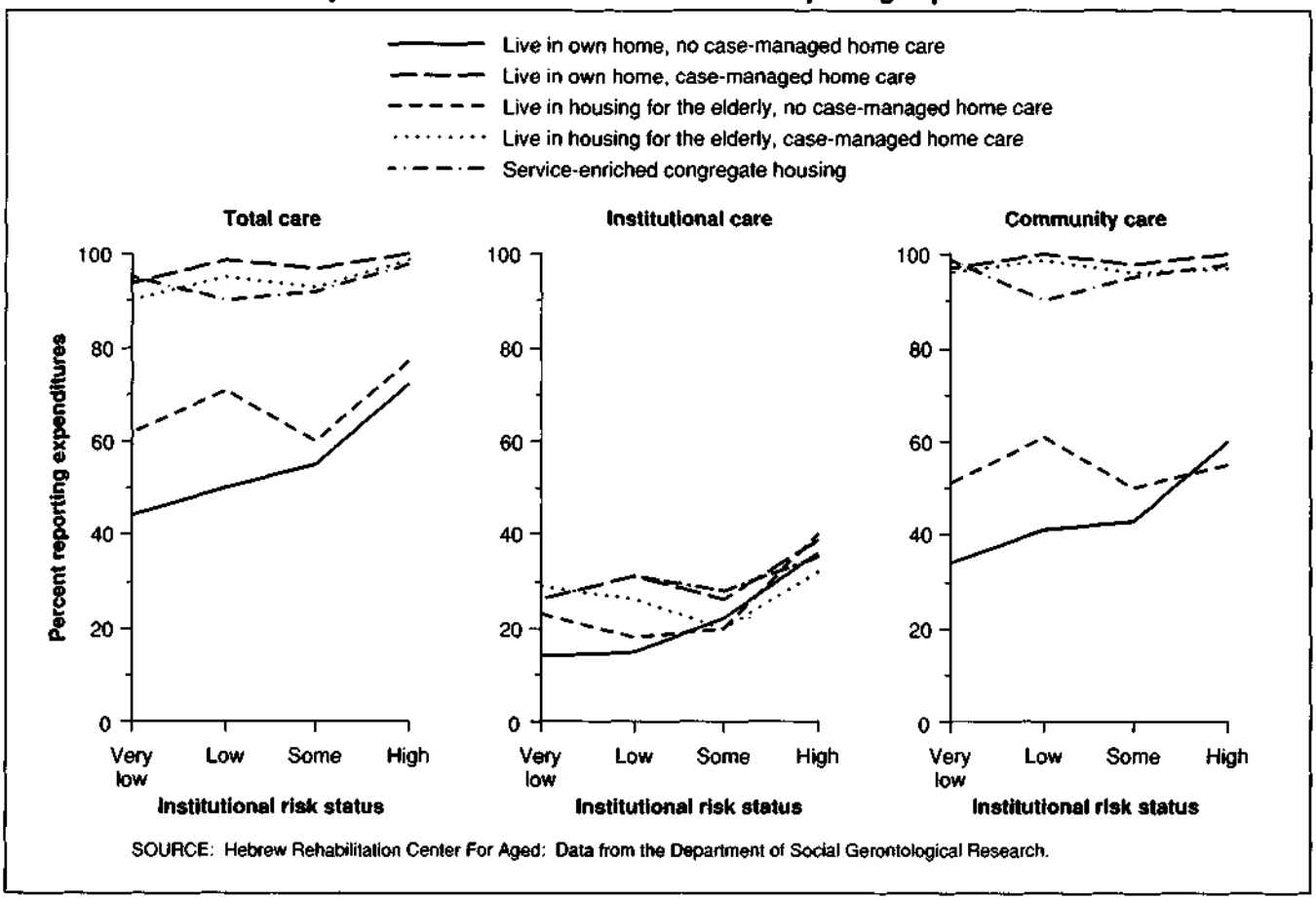
Use of services

Significant differences exist in the percent of individuals in each housing and service setting who report any expenditures for formal care. As can be seen from the total care plot in Figure 1 and the data in Table 5, the cohort of persons who live in their own homes and do not receive any case-managed home care has the lowest percent of individuals with any formal service use across each of the four IR levels. At the very low IR level, 44 percent of the individuals had expenditures for care, rising to 72 percent of the group at the high IR level. The cohort living in housing for the elderly but not receiving case-managed home care has the second-lowest expenditures, followed by the three cohorts receiving case-managed home care. For these three groups, the percent of cohort members having expenditures for care ranged from 90 to 100.

Within IR levels, a number of distinct groupings emerge. For all four IR categories, the three housing settings with case-managed home care constitute a single, and high, use group. At the two lowest IR levels, two additional distinct groups emerge: individuals living in housing for the elderly, with no case-managed home care, and individuals living in their own homes, with case-managed home care. At the two higher IR levels, the two cohorts of elderly persons not receiving case-managed home care display

Figure 1

Covariance-adjusted estimates of cohort members reporting expenditures for care



SOURCE: Hebrew Rehabilitation Center For Aged: Data from the Department of Social Gerontological Research.

Table 5

Percent of study participants reporting any expenditures for formal care, by institutional risk group

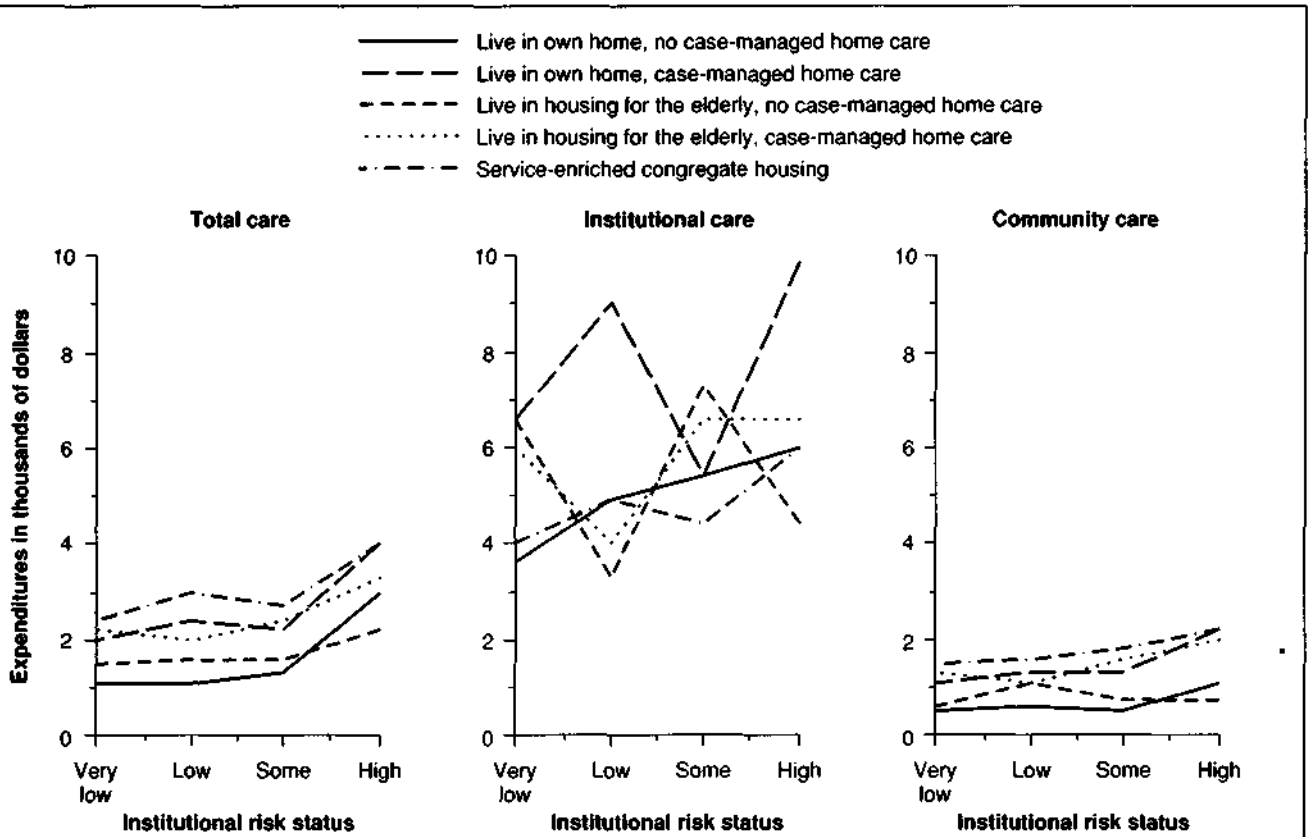
Type of care received	Housing and service arrangement: Living in own home, no case-managed home care	Living in own home, plus case-managed home care	Living in housing for the elderly, no case-managed home care	Living in housing for the elderly, plus case-managed home care	Living in service-enriched congregate housing	Significance level ($p=$)
All care			Percent			
Very low	44	94	62	90	85	<.001
Low	50	99	71	95	90	<.001
Some	55	97	60	93	92	<.001
High	72	100	77	99	98	<.001
Institutional care						
Very low	14	26	23	29	26	.002
Low	15	31	18	26	31	.003
Some	22	28	20	20	26	.24
High	36	35	40	32	39	.34
Community-based care						
Very low	34	97	51	96	99	<.001
Low	41	100	61	99	90	<.001
Some	43	98	50	96	95	<.001
High	60	100	55	97	98	<.001

NOTE: Data in this table represent covariance-adjusted estimates.

SOURCE: Hebrew Rehabilitation Center For Aged: Data from the Department of Social Gerontological Research.

Figure 2

Covariance-adjusted estimates of expenditures for formal care



SOURCE: Hebrew Rehabilitation Center For Aged: Data from the Department of Social Gerontological Research.

statistically comparable profiles and together constitute a lower use group.

Disaggregating the data into institutional care and community care components provides some insights into which service categories contribute most to the overall pattern. A comparison of the institutional and community profiles in Figure 1 and Table 5 reveals that for all five housing and service settings, less than one-half of the members of each cohort reported any institutional care use. With regard to community-based services, only two of the cohorts—those not receiving any case-managed home care—had service use levels at the 50-percent-or-lower threshold.

The relatively small spread among the five settings that appears in the institutional data in Figure 1 and Table 5 indicates the presence of only a few distinct service-use groups across IR levels. At the two lowest IR levels, two distinct groups emerge: a higher use group that includes the three case-managed cohorts and a lower one made up of the individuals in their own homes and receiving no case-managed home care. The cohort of individuals living in housing for the elderly and not receiving case-managed home care displays a pattern that is not significantly different from the lowest use group (their counterparts in the "own home" cohort) or from one cohort in the highest use group—those in housing for the elderly and receiving case-managed home care. They thus appear to be in a midpoint position between the high- and low-use groups, although they themselves do not constitute a distinct group in a statistical sense. No statistically significant differences emerge for the two top IR groups (some and high). Thus at these IR levels, individuals in all of the five housing and service settings have an equal probability of using services.

The groups that emerge in the community care panel mirror those reported for total care. At both the very low and low IR levels, three distinct groups emerge. The highest group consists of the three cohorts receiving case-managed home care. The middle group is made up of individuals not receiving case-managed home care and living in housing for the elderly, and the lowest group is individuals not receiving case-managed home care and living in their own homes. At the two higher IR levels, two groups emerge. The higher use group consists of the three cohorts receiving case-managed home care and the lower one consists of the two cohorts not receiving case-managed home care.

Table 6

Covariance-adjusted estimates of expenditures for formal care, by institutional risk group

Type of care received	Housing and service arrangement: Living in own home, no case-managed home care	Living in own home, plus case-managed home care	Living in housing for the elderly, no case-managed home care	Living in housing for the elderly, plus case-managed home care	Living in service-enriched congregate housing	Significance level ($p =$)
All care	Estimated expenditures					
Very low	$1,097	$1,998	$1,480	$2,208	$2,441	<.001
Low	1,097	2,441	1,636	1,998	2,981	<.001
Some	1,339	2,208	1,636	2,441	2,697	<.001
High	2,981	4,024	2,208	3,294	4,024	<.001
Institutional care						
Very low	3,641	6,634	6,634	6,003	4,024	.09
Low	4,915	8,955	3,294	4,024	4,915	.11
Some	5,432	5,432	7,332	6,634	4,447	.61
High	6,003	9,897	4,447	6,634	6,003	<.001
Community-based care						
Very low	545	1,097	602	1,339	1,480	<.001
Low	602	1,339	1,097	1,097	1,636	<.001
Some	493	1,339	665	1,636	1,808	<.001
High	1,097	2,208	735	1,998	2,208	<.001

NOTES: The number of observations for each of the 12 rows in this table are 810, 482, 813, 1308, 245, 148, 261, 527, 724, 439, 746, and 1236. *Individuals without institutional or community-based service expenditures are not included in these data profiles.*

SOURCE: Hebrew Rehabilitation Center For Aged: Data from the Department of Social Gerontological Research.

Expenditure patterns

All care

Covariance-adjusted estimated expenditures for formal care are plotted in Figure 2 and presented in Table 6. The covariance-adjusted expenditure data indicate that the average annual expenditures (which approximate median levels) for all care across all five housing and service settings ranges from a low of about $1,000 to a high of about $4,000 (in 1985 dollars). Within each of the five housing and service settings there appears to be a fairly consistent expenditure progression from the very low IR group to the high group. As expected, the average expenditure for institutional care, when it occurs, is much higher than the expenditure for community care. Expenditures for institutional care exceed expenditures for community care by a multiple ranging from 2.7 for the high IR group in the service-enriched, congregate-housing cohort to 11 for the group of persons living in their own homes and not receiving case-managed home care, who are at some risk for institutionalization. Also, the very-low-risk segment of those living in housing for the elderly and not receiving case-managed home care had expenditures for institutional care exceeding those for community care by a multiple of 11.

A number of distinct clusters emerge from the contrasts performed as part of the MANOVA analysis. One pattern is common to all of the findings: The three housing settings in which case-managed home care is provided always form the top (i.e., highest expenditure) cluster. From the perspective of total expenditures for care, two distinct clusters emerge for the very low IR level: The three cohorts receiving case-managed home care form one cluster, and the two cohorts not receiving case-managed home care form the other. The first of these clusters has an expenditure profile of about $2,200 per year; the second cluster's expenditure profile appears to be in the $1,200 range. For the second-lowest IR group, three distinct clusters emerge. The highest expenditure cluster is made up of the three cohorts receiving case-managed home care. The middle cluster consists of individuals living in housing for the elderly and not receiving case-managed home care. The lowest expenditure cluster consists of those living in their own homes and not receiving case-managed home care. The annual expenditure profiles exhibited by these three clusters are approximately $2,400, $1,600, and $1,100, respectively.

For those individuals who are in the third IR group (some), a slightly different configuration emerges. As in the previous cases, the three cohorts receiving case-managed home care constitute the highest expenditure group. Their annual expenditure profile appears to be in the $2,400 range. The low-expenditure group is made up of individuals living in their own homes and not receiving case-managed home care. Their annual expenditure is about $1,300. Those living in housing for the elderly and not receiving case-managed home care have an expenditure profile ($1,600) that is not significantly different from either the low group or one cohort in the high group—those individuals living in their own homes and receiving case-managed home care ($2,200). Thus, as in the previous analysis, a cohort

appears to occupy a point midway between the high- and low-expenditure clusters without belonging (in a statistical sense) in either of the two groups.

At the highest IR level, a new configuration emerges that is distinctly different from any previously noted. Individuals living in their own homes and not receiving case-managed home care join the three cohorts receiving case-managed home care to form the high expenditure group. This overall group has an annual expenditure profile in excess of $3,200. The low expenditure group, with an expenditure profile of $2,200, is made up of those living in housing for the elderly and not receiving case-managed home care.

Institutional care

Despite the dramatic movements of the lines representing the five housing and service settings in the panel showing expenditures for institutional care in Figure 2, a statistically valid difference at conventional levels emerges at only one IR level—the high-risk category. For that IR level, two significant clusters emerge. The high-expenditure cluster consists of people living in their own homes and receiving case-managed home care. Their annual expenditures for institutional care are about $9,900. The four remaining housing settings—two of which involve case-managed home care and two that do not—constitute the low-expenditure group. Their expenditures for institutional care appear to be in the $6,000 range.

Although not significant at conventional levels, two patterns that have *F*-statistics at the 0.09 and 0.11 levels, respectively, merit some note. At the very low IR level, two clusters can be detected. The high-expenditure group consists of three housing and service settings: individuals living in housing for the elderly (both those who receive and those who do not receive case-managed home care) and individuals living in their own homes and receiving case-managed home care. The low-expenditure group is made up of those living in their own homes and not receiving case-managed home care and those living in service-enriched congregate housing. In addition, at the low IR level, individuals living in their own homes and receiving case-managed home care constitute a high-expenditure group, and those in the remaining four housing and service models collectively constitute the low-expenditure group. (For an analysis of distinct hospital and nursing home use patterns, see Morris et al., 1987.)

Community-based care

When assessing expenditures for community-based service, significantly distinct clusters emerge for each of the four IR levels. At the lowest level, two clusters can be detected. The high-expenditure cluster consists of the three housing settings in which case-managed home care is provided, and the low-expenditure cluster consists of the two housing settings without case-managed home care. The annual expenditures for community services for the high-expenditure cluster are more than $1,100, as opposed to less than $600 for the low cluster. At the second (i.e., low) IR level, the three cohorts receiving case-managed home care and the cohort living in housing for the elderly and not receiving case-managed home care constitute the high group. Their annual expenditures for community services exceed $1,100. Those people living in their own homes and not receiving case-managed home care constitute the low group, with annual expenditures for community care of $600.

Three distinct clusters emerge for individuals who are at moderate risk for institutional care. Elderly persons in either of two housing and service settings (service-enriched congregate housing and housing for the elderly and receiving case-managed home care) constitute the highest group. Their annual expenditures are more than $1,600. Individuals living in their own homes and receiving case-managed home care constitute the middle group, exhibiting an expenditure level of about $1,300. The two cohorts that do not receive case-managed home care form the low-expenditure group. They exhibit an expenditure level of less than $670.

At the high IR level, three distinct clusters also emerge. The high group, with annual expenditures of approximately $2,000, consists of elderly persons in the three housing settings with case-managed home care. Elderly people living in their own homes and not receiving case-managed home care make up the middle group, displaying an annual expenditure level of about $1,000. The low group consists of people living in housing for the elderly and not receiving case-managed home care. Their average annual expenditure was $735.

Multiple comparisons of the settings

For each of the settings included in the study, fairly distinct expenditure patterns emerge. Expenditures clearly increase as a person's frailty, as measured by IR status, increases. But even at the lowest IR level, expenditures exceed $1,000 per year. If the first housing and service setting (those who live in their own homes and do not receive case-managed home care) is taken as the reference group, our research (i.e., Tables 5 and 6) indicates the growth in the number of people who will use both institutional and community-based care and the dollar value of such care, in conjunction with either group housing and/or case-managed home care.

To demonstrate the specific statements that can be supported by the profiles presented in this article, five pairs of housing arrangements have been identified in Table 7. The second component of each pair represents a higher level of program involvement than does the first component. Statistically significant differences in the percent of individuals who report any expenditures as well as in the expenditure levels among those using any service are also noted in this table. Comparisons are made for all three of the

Table 7

Significant differences in service use and expenses for care within institutional risk (IR) groups for selected housing arrangement pairs

Living arrangement comparison pairs	Variable	IR group			
		Very low	Low	Some	High
Live in own home, no case-managed home care versus live in housing for the elderly, no case-managed home care	Use	T+,C+	T+,C+		
	Expenses	I+	T+,C+		T−,C−
Live in own home, no case-managed home care versus live in own home and case-managed home care	Use	T+,I+,C+	T+,I+,C+	T+,C+	T+,C+
	Expenses	T+,I+,C+	T+,I+,C+	T+,C+	T+,I+,C+
Live in housing for the elderly, no case-managed home care versus live in housing for the elderly and case-managed home care	Use	T+,C+	T+,C+	T+,C+	T+,C+
	Expenses	T+,C+	T+	T+,C+	T+,C+
Live in housing for the elderly with case-managed home care versus live in service-enriched congregate housing	Use				
	Expenses	I−			
Live in own home without case-managed home care versus live in housing for the elderly with case-managed home care and service-enriched congregate housing	Use	T+,I+,C+	T+,I+,C+	T+,C+	T+,C+
	Expenses	T+,I+,C+	T+,C+	T+,C+	C+

NOTES: T is total care; I is institutional care; C is community care.
+ means second part of pair exhibits a higher value.
− means second part of pair exhibits a lower value.

SOURCE: Hebrew Rehabilitation Center For Aged: Data from the Department of Social Gerontological Research.

study's dependent variables: total care, institutional care, and community-based care. As in all the previous analyses, separate comparisons are made for each of the four IR levels.

The first comparison reflects solely a substitution of group housing (i.e., housing for the elderly) for one's own home or apartment. Individuals in both housing groups are not receiving case-managed home care. For the two lowest IR groups, a higher percentage of people in housing for the elderly report the use of community-based care. Because of this, they also have a higher use of all care. On the expenditure side, this pattern is replicated only for the low IR category. For those in the very low IR category, a difference emerges only for institutional care, and this difference results from a test in which the overall F-statistic is significant only at a relaxed threshold of $p<0.09$. An interesting and unique finding emerges for those individuals in the high IR category. Expenditures for community services, and consequently also for total care, are higher for those living in their own homes than they are for those in housing for the elderly. Thus for those at the highest risk level, residence in group housing does produce resource use savings of approximately $770 per year for those who used services.

Two different pairs were constructed to examine the impact of the addition of case-managed home care. The first pair contains individuals living in their own homes, and the second pair consists of individuals living in housing for the elderly. In both pairs, those receiving case-managed home care display higher use and expenditure patterns for community services (and consequently for all services) than do those not receiving case-managed home care. (The one exception to this pattern is the low IR group in the pair that compares housing for the elderly. Expenditures for community care are comparable in this case, although expenditures for all care are not.) A number of differences with regard to institutional care appear in the comparison of persons in their own homes for the two lowest IR categories, but the expenditure differences are significant only at a relaxed statistical threshold. A further significant difference emerges for the high IR category, where a $3,000 differential can be expected for institutional care expenditures.

The fourth comparison is between those in housing for the elderly receiving case-managed home care and those in service-enriched congregate housing. With one minor exception, no significant differences can be detected between these two arrangements. The exception, which emerges with an overall F-statistic that is only significant at $p=.09$, favors the service-enriched congregate housing setting for individuals in the very low IR category, who have lower expenditures for institutional care.

The final comparison is between individuals living in their own homes and not receiving case-managed home care versus a combined cohort of individuals in housing for the elderly and receiving case-managed home care and individuals in service-enriched congregate housing. At all four IR levels, use of and expenditures for community services are higher in the group housing sector. With one exception (the high IR group), this pattern is duplicated at the level of total care. A significant differential with regard to percent of individuals using institutional care does emerge for the two lowest IR categories, but this differential appears at the expenditure level for only the low IR group.

Discussion and policy implications

The profiles reported here, which assess the impact of case-managed home care programs in conjunction with independent and group housing environments, confirm the findings reported in other studies that case-managed home care does not yield large enough hospital and nursing home care savings to cover its cost (Weissert, 1985; Kemper, Applebaum, and Harrigan, 1987). This can be illustrated by considering the average of the three case-managed home care settings versus the average of the two settings without case-managed home care. For each IR level, the first cohort has total expenditures that exceed those of the second. This differential across the four IR levels is $837, $1,106, $961, and $1,186 (in 1985 dollars). (Data derived from Table 6.) Targeting the case-managed home care to the highest IR group, if anything, leads to the highest "loss."

Clearly, case-managed home care will lead to higher expenditure levels. If a decision is made to provide this service, one should be prepared to incur higher expenditures. However, this does not mean that there is no justification for this service. It may, as suggested by Weissert (1985) and reported in the Channeling experiment evaluation (Applebaum et al., 1988), improve the individual's quality of life and/or it may relieve the pressure borne by the informal care network. Political realities may also lead to the provision of case-managed home care; the pressure for care will grow as the population ages, despite the absence of cost savings.

The expenditure profiles reported in this study not only add to the growing literature assessing case-managed home care programs but also present expected annual use and expenditure levels (in 1985 dollars) for various cohorts of community-residing elders both by their risk of a nursing home placement and by their type of residence. To the best of our knowledge, such estimates have not been reported previously in the literature. If home care services are to be provided to the needy elderly, with or without a case-management component, then such estimates are needed to facilitate planning and budgeting efforts.

Three findings specific to individual IR groups merit special comment. People in the lowest (i.e., very low) IR group reported fairly substantial use of case-managed home care. Our data sets did not permit further exploration of this phenomenon, but we suggest two possible explanations for this pattern. First, this care may result from enrolling people with time-limited, post-acute hospital recovery needs who were not removed from program rolls when those needs were no longer present. Individuals with such needs would be classified, using the IR assignment system, as being at very low risk for a nursing home placement. Second, this substantial use of case-managed home care may indicate problems in targeting services to individuals. If either of these suggestions is true, then program managers need to develop better mechanisms for targeting and reassessing care.

People at high risk for institutional placement who live in their own homes or in housing for the elderly and who use no community services are a second group meriting some attention. We hypothesize that these individuals either are socially isolated or simply refuse any offer of care. They clearly represent a challenge to program administrators and policymakers who would like to be able to provide them with care.

The relatively lower total expenditure profiles for high-risk individuals living in group housing raise an interesting issue as to whether greater efforts should be made to target the limited stock of such housing to these individuals. Although our findings suggest a financial basis for advocating such a policy, we recognize that people classified as high risk under the IR assignment system are quite frail and are not normally considered "attractive" tenants in a tight housing market. If they are to be given preference for the housing that is available, an explicit position would have to be enunciated by policymakers to improve their chances of obtaining such housing.

In assessing our findings, the reader is reminded of a number of limitations inherent in our study. First, despite the stratification by IR level and the use of covariate adjustments, the five housing and service settings may still not be completely comparable. There may be supply-induced effects in some geographic settings that were not addressed by the covariance adjustments because of a lack of such data. Furthermore, not all services that are important to the community-based elderly were included in the analysis. The exclusion of data on outpatient physician care and on the use of informal care are notable in this regard. Finally, although the use of the IR assignment system creates greater within-group homogeneity and is a reliable way of summarizing the general set of forces that precipitate an institutional placement, one must recognize that not all elders identified as being at high risk for a nursing home admission will indeed enter a nursing home. Although helpful for research, the use of the IR system does not automatically provide a sure way to estimate cost savings when care is targeted to those at greatest risk. Without minimizing these limitations, it appears that short of conducting prospective randomized trials (which appears highly unlikely in the current fiscal environment), quasi-experimental comparisons such as these will have to be used to guide policymaking. Thus additional research using existing data sets and simulating actual or potential interventions is needed to further the knowledge base in long-term care.

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